



New Hampshire Rural Health Report, 2004



**New Hampshire Department of Health and Human Services
Division of Public Health Services
Bureau of Community Health Services
Community Health Development Section
Rural Health and Primary Care Unit**

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MESSAGE FROM THE GOVERNOR

Access to health care in the rural communities of New Hampshire is a significant issue today. Residents of rural areas have an economic disadvantage under larger communities when it comes to public health facilities. The Bureau of Rural Health and Primary Care is working to provide healthy outcomes to this challenge. This report shows how we are working to meet the needs of those in rural areas.

Promoting rural health initiatives is important. We will not walk away from our commitment to public health across the state, whether in Manchester, the Seacoast, the North Country or anywhere in between. The Department of Health and Human Services is working with every community, large or small to develop a plan to give access to health care to the residents of the state.

I would like to thank the staff that put together this comprehensive report. I know they will work tirelessly to find solutions to these matters and I fully support their efforts.

Craig R. Benson
Governor

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EXECUTIVE SUMMARY

This study explores differences in the health and health-related statistics between rural and non-rural parts of New Hampshire. Using a unique rural definition designed to reflect the nature of the state, the study draws on a wide range of existing data sources to identify and quantify differences in underlying demographics, health care access, health related behavior, and health outcomes. Although there are many aspects of rural health and health care delivery for which data are not readily and uniformly available, the findings of this study highlight that there are real, significant, and observable differences in the health profile of the state's rural and non-rural communities. These differences impact the health and safety of rural residents of the state, and continually challenge the state's rural providers to remain viable while providing access to high quality health care services.

In many ways, the differences observed in the health statistics of rural residents might be even greater than those observed if it were not for the numerous rural initiatives already in place to mitigate them. Many of the state's rural hospitals have explored and adopted Critical Access Hospital status, along with other facility and service modifications, to enable them to remain viable while many rural hospitals across the country were closing. These hospitals also support primary care delivery systems in their service areas, and there has been significant expansion in the Community Health Center network in rural parts of the state, to further promote and improve access. There have also been important and successful efforts to stretch resources by coordination and integration of care through network development in these areas.

Although there are some statistics that show health benefits for rural residents, the majority of the differences identified show adverse health related measures in New Hampshire's rural areas.

In reviewing these statistics, one must keep in mind that, overall, New Hampshire's health statistics are favorable compared to other areas of the country, and even New England. According to the Morgan Quitno Press' annual state health rankings, New Hampshire was the healthiest state in the nation in 2000ⁱ, and has consistently ranked in the top 5 nationwide from 1997 to 2002 based on a series of prominent health status indicators. One must also keep in mind, however, that the statistics that comprise such a finding are based on the overall population of the state – the great majority of which is considered “non-rural” by the definition used in this study (and other national definitions). Because of this, significantly different statistics for the rural population do not greatly sway the state's overall statistics. The residents of the most rural tier in the study, whose communities comprise 42% of the states land, represent only 6% of the state's population. Though the statistics for this group often differ most dramatically

from those of the non-rural population, it is easy to see how their impact can be overlooked at the state level.

The findings of the study are generally consistent with the findings of national studies that examine the impact of rural life on health statistics – particularly when the major metropolitan areas and frontier rural areas are eliminated. Although there are some statistics that show health benefits for rural residents, the majority of the differences identified show adverse health related measures in New Hampshire's rural areas.

Some of the most notable differences were in the demographic characteristics of the rural residents, which impact health status and access. Rural residents of the state are significantly older, poorer, & less educated than non-rural residents. These factors have all been shown to impact health status and access. Furthermore, the expansion of the elderly portion of the population over the past 10 years was particularly evident in rural areas. Rural residents were also far more likely to be unemployed or out of the labor force, and rural workers are more likely to be self-employed or to work in industries where health insurance benefits are less available. These factors likely form the basis of several other observed disparities that are more directly health related. While the study attempts to control for demographic differences in resident age for research purposes, the added need for services is very real in rural areas.

The study looked at a variety of health service indicators with rural implications. The EMS records for the state were analyzed and showed dramatic differences in the overall response time and the percentage of calls that arrived within an 8-minute standard in rural areas, as well as demonstrating that the differences are largely related to structural issues in the rural EMS system. On a positive note, the total number of primary care providers in rural areas increased faster than in non-rural areas in the past few years, and total provider ratios also appeared favorable, though access to Pediatricians and Obstetrician/Gynecologist providers was more limited. Rural residents seem to have comparable use of preventive services based on survey data.

Health insurance was one of the greatest areas of disparity in rural areas. Rural residents were significantly less likely to be insured for health services, but more likely to be on Medicaid. These insurance patterns were reflected in the inpatient payor mix, and even more prominently in the payor mix for visits to hospital Emergency Departments. The majority of the uninsured were in employed families, however rural residents were less likely to have an employer sponsored health insurance option. Rural residents were also less likely to be insured for dental services.

In terms of health outcomes, the overall mortality rate of rural residents was comparable to that of non-rural residents once age adjusted, but was significantly higher in absolute terms due to the higher elderly population. Rural residents of the state, however, showed dramatically higher rates of accidental and injury related deaths. Birth statistics showed much higher rates of perinatal risk factors in rural areas, but access to prenatal care was favorable, which may explain the comparable outcomes in terms of low birth-weight and infant mortality. Hospitalization rates could not be fully explored due to limitations in

the available data, but it was possible to observe a higher overall age-adjusted hospitalization rate for rural residents and a very significant difference in the rate of psychiatric hospitalizations for rural residents.

Although there are many additional questions regarding rural health that an analytic study cannot fully assess, this report shows that New Hampshire's rural residents do experience many of the disparities in health status and access that are often associated with rural life. Significant efforts have already been undertaken by state agencies, rural providers, and rural communities in an effort to address these disparities, but it is clear that there is additional work to be done. The study is intended to form the basis of future planning efforts around the health care issues of the state's rural residents, as well as a framework for ongoing monitoring of progress toward the goal of eliminating health related disparities in the state.

A. OVERVIEW

What does it mean to be a 'rural' community in New Hampshire? This question is often asked and the answers are as varied as the people and perspectives in the state. Some compare New Hampshire to the farm belt or frontier areas of the country and say that no part of the state is truly rural. Others view the state from the perspective of the urban hubs of the northeast, such as Boston or New York, and make the case that few parts of the state seem even remotely urban. While both of these perspectives are valid to a certain extent, simply lumping the entire state into a single category ignores some very real differences in the nature of its communities, and the lives of the people that reside in them.

Some of these differences, such as smaller towns, more open space, and less dense population, are inherent in any definition of rural areas. Others, such as the age distribution of residents and the nature and value of employment, are strongly correlated with the rural nature of an area, and are the result of broad social and economic patterns of modern living. The physical distance between people and resources in rural areas, as well as the social, demographic, and economic factors that correlate with rural communities, can ultimately have a strong impact on the health of the area's residents, and the way in which services are delivered. The need for additional attention and resources to focus on identifying and reducing rural health disparities has formed the foundation of numerous rural health programs and initiatives from the local to the national level.

This study is designed to explore the differences in health and health-related statistics between the more and less rural areas of the state. The State of Health in Rural New Hampshire is an analytic document intended to answer two basic questions:

- 1) Are there differences in the health and health related statistics between more and less rural parts of New Hampshire.
- 2) If so, what is the nature and magnitude of those differences?

The answers to these questions are essential to effective health planning from the state level, within agencies and organizations that fund and administer health services, down to initiatives at the local level and even within individual provider organizations in rural communities. This is particularly true because the health status of the rural population is easy to overlook. Most health statistics are population based, and rural areas are, by definition, sparsely populated. When statewide statistics are reviewed, the impact of very real and distinct differences in the health statistics of rural residents is overshadowed by the magnitude of the non-rural population. Unless special attention is paid to studying and highlighting the statistics of the minority rural population, it is easy to overlook these differences.

The limitations of the study approach, which relies on secondary analysis of existing data to examine rural health disparities, must also be noted. There are many aspects of rural

health status and care delivery for which there are no uniformly available statewide data, including several often noted as important issues for the rural health delivery system. These include issues such as the cost of providing services and maintaining quality, difficulties in managing staffing and assuring call coverage, and the personal and professional isolation experienced by providers. Additionally, there are limitations to the analysis related to the power of the statistics in rural areas of the state. Low-frequency conditions, and statistics derived from a sample (such as a survey), require a larger population base to achieve statistical significance. As a result, some measures may show no statistically significant difference even though there are sizeable differences in absolute terms.

As the findings of the report indicate, there are statistically significant differences in many of the domains examined. When statewide statistics are dissected along rural/non-rural lines, it becomes clear that many are comprised of considerably different profiles for the rural and non-rural residents of the state. In general, many of the patterns identified are similar to patterns observed in national studies comparing rural and urban areas. The most comprehensive national report, the Urban/Rural Chartbook of Health, United States, 2001, produced by the federal Centers for Disease Control and Prevention (CDC) uses a county level definition. That study finds that the extremes of urban and rural populations (those in counties with large central cities and rural counties with no city of 10,000 people respectively) generally show the most adverse health statistics, and are statistically similar in many ways. Interestingly, New Hampshire has no counties that fall into either of these two categories. The most favorable statistics nationally tended to be in the 'fringe' counties of metropolitan areas (representing New Hampshire's most urbanized areas), and numbers generally became less favorable with increasing rurality. The fact that New Hampshire has no areas at the extremes of the national rural-urban continuum (areas in which many health statistics are the most similar and most adverse) may help explain the findings to some degree. The state tends to have favorable health and social statistics compared with the nation as a whole, but the differences between the health statistics of our rural and non-rural populations are often more pronounced.

B. METHODS

1. Defining Rural in New Hampshire

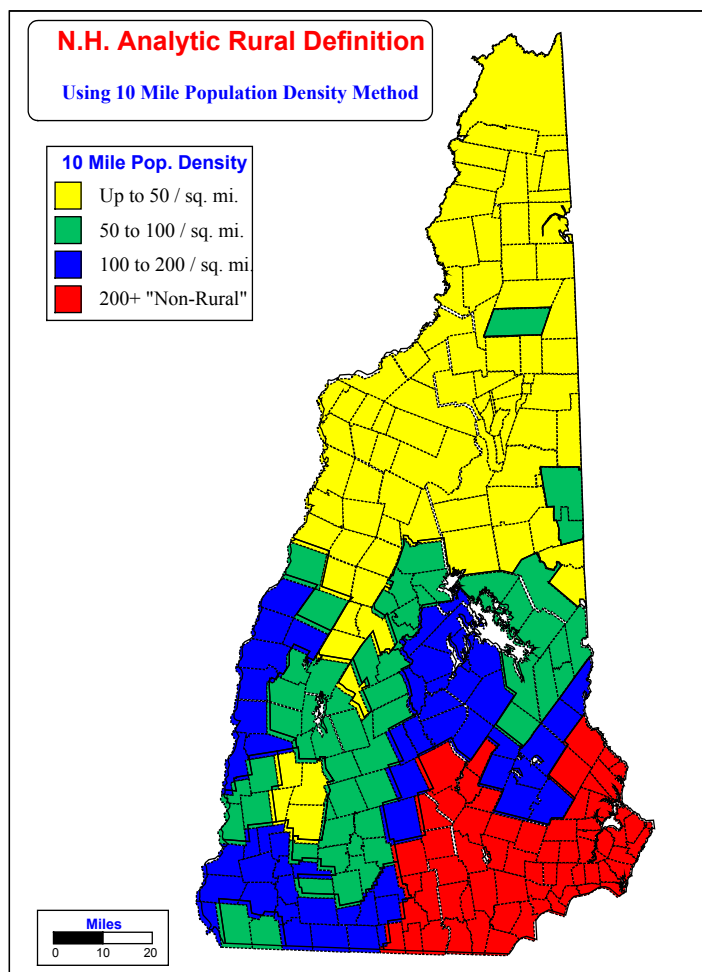
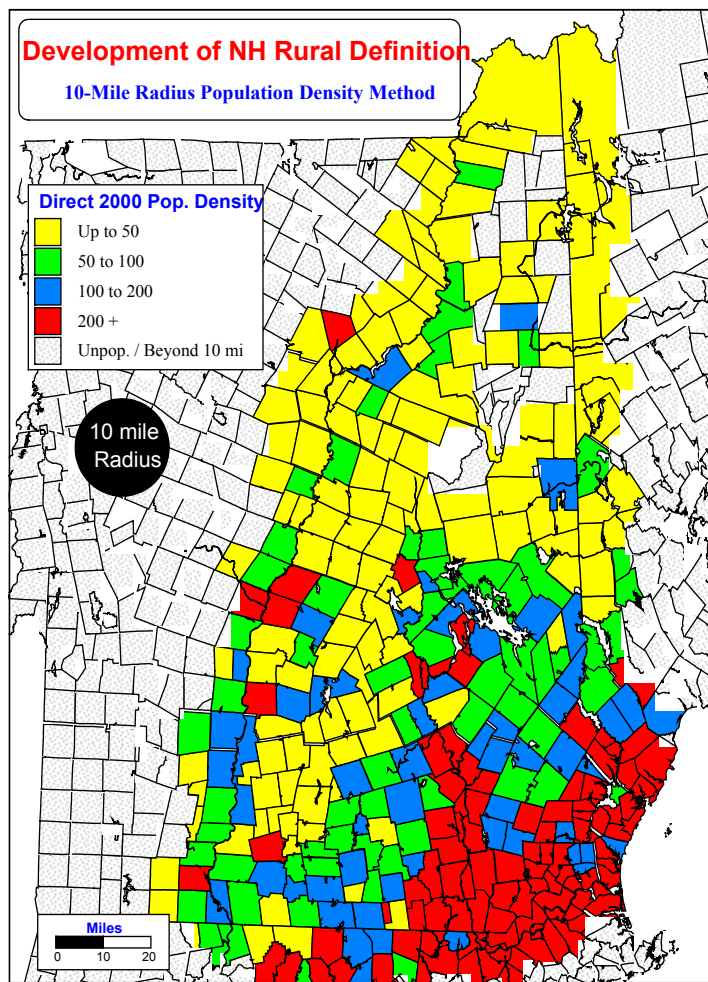
Although there are many established definitions for 'rural' in existence (including the one noted in the CDC study above), this study is based on a unique definition of rural areas for the state. The existing definitions for rural were considered in planning for the study, but were found not to meet the criteria felt to be essential for a complete and valid analysis. These included:

- ◆ A definition based on units of geography which correlate with the structure and content of existing data sources.
- ◆ A definition which treats rural as a continuum, allowing for sub-analysis of more and less rural areas of the state.

- ◆ A definition which is sensitive to the range of the urban rural continuum that exists in New Hampshire.
- ◆ A definition that yields comprehensible geographic clusters and does not overly fragment the state.
- ◆ A definition which is objective and independent of health-related measures, but which is reflective of the meaning of 'rural' from a health care perspective.

During the development of the rural definition, an informal questionnaire was administered to the members of New Hampshire's District Councils during a statewide meeting. This body consists of over 250 citizens throughout the state who provide community input to the state's ongoing health planning activities. The questionnaire asked the representatives from all areas of the state to define their district as either wholly rural, wholly urban, or mixed, and to classify their town of residence in a similar manner. They were also asked to define what characterized rural areas of the state. In summary, no counselor felt that their district was wholly urban (even in the most urbanized parts of the state), and there was a great deal of variation in the way individual towns were categorized. In terms of defining rural characteristics, most referred to the density of the population and the proximity of various resources (such as stores) as key factors.

Because low population density is the most widely recognized characteristic of rural areas, and NH health statistics are most widely available at the town level, the rural definition developed for this report is based on a 'buffered' population density approach, using town-level units of geography. The direct population density within each town is highly variable and leads to a fragmented and skewed picture because it ignores resources in surrounding towns. To mirror the perspective of an average individual in each town, a 10-mile radius 'buffer' was generated around the centroid (geographic center) of each town in the state. These overlapping circular buffers were then used to calculate the proportion of land (excluding any portions representing water) and population (from the 2000 census) that fell within each circle. Those statistics were then used to develop a 10-mile buffered population density for each town. The figures below show the underlying data and the result. The map on the left shows the raw population density of each town in and surrounding NH, as well as the size of a 10-mile radius buffer. The map on the right shows the resulting rural definition used for this report. Please refer to Appendix C of the report for a listing of which towns are included in each of the defined rural tiers.



As the maps show, the buffering method mitigates the variability between individual towns and better reflects the ways in which communities are connected to each other. A densely populated town surrounded by sparsely populated areas becomes more rural by this definition, while a similar town bordered by high-density communities becomes less rural.

The 10-mile radius for the buffers was determined based on half of the allowed distance between population centers for the federal Health Professional Shortage Area criteria (meaning these areas would overlap for any communities that could be seen as sharing primary care resources). The cuts between the groups, at densities of 50, 100, and 200 persons per square mile, were selected after examining a range of options. These categories preserved sufficient population for analysis within each rural tier, while still reflecting meaningful differences between the areas. A number of representatives from the health care community in different parts of the state were asked to comment on the definition, and it was generally found to be reflective of their conceptual groupings of rural areas in the state.

The table below highlights the differences between the areas in the different rural tiers of NH. Taking the 3 rural tiers together, one sees that 84% of the state's land mass is rural, but this accounts for only 37% of the population. Half of the 'rural' land mass (42% of the state's land overall) is in the most rural (low density) tier, which represents only 6% of the state's population.

Conversely, nearly two-thirds of the state's population lives in the non-rural tier, representing the 16% of land in the southeastern part of the state. The population density in this area is 4 times that of the most dense rural tier, and nearly 30 times the density of the most rural parts of the state. Note that, throughout the report, the term 'non-rural', rather than 'urban', is used to describe this tier. The term acknowledges that this report only seeks to define and explore rural issues, and defines the remainder of the state as a comparative group only. A study of *urban* NH would almost certainly yield a different definition than what is defined as non-rural. The non-rural tier, however, does closely approximate the Metropolitan Statistical Area (MSA) defined by the Federal Office of Management and Budget (OMB).

	Population	% Pop.	Cumulative Population	Cumul. % Pop.	Area (Sq. Miles)	% Area	Cumul. Area	Cumul. % Area	Tier Pop. Density
Rural Low Density	71,881	6%	71,881	6%	3,860	42%	3,860	42%	19
Rural Med. Density	146,160	12%	218,041	18%	2,034	22%	5,894	64%	72
Rural High Density	242,204	20%	460,245	37%	1,822	20%	7,716	84%	133
Non-Rural	775,305	63%	1,235,550	100%	1,437	16%	9,153	100%	539

2. Analytic Methods

Using the rural definition described above, the study seeks to explore any differences in the health and health-related statistics for these different rural tiers. There is a wide variety of potentially interesting data available in a format that is amenable to grouping according to this definition. Appendix A describes the data sources that were obtained for this study, including the time frame reflected by each set. Due to constraints on data availability and release schedules, it was not possible to select a single timeframe for the study that covers all data examined. For each dataset, the data obtained was the most recent information available in a useable format. In some instances multiple years of data were grouped to provide increased statistical power. Also, prior periods of data were gathered for some measures to allow for trends in key statistics to be explored.

The study focuses primarily on population-based or sample-based statistics pertaining to the residents of each of the towns that comprise the rural tiers. For example, hospitalizations are reported based on the residence of the patient, rather than where they went for service. The exceptions to this include several statistics which are not residence based, but felt to be reflective of the nature of health care access by residents of the communities being described. For example, the EMS database, which reports ambulance runs, was analyzed based on proportions of runs for the town the ambulance was called

to, even though the patient(s) may not have been from that town. As such, there is no valid population denominator for such statistics but they are reflective of EMS runs to that town.

Because the report is focused on describing rural health statistics for the state, the first level of analysis for each measure is to examine the difference between the statistic for all rural tiers combined, compared to the non-rural tier. As such, the three categories of rural are collapsed into a single statistic and tested against the non-rural measure. This is shown as the 2-Tier Rural definition in the accompanying charts, while the sub-category definition is shown as the 4-Tier Rural statistic. The sub-categories of rural are examined to determine if the pattern is uniform across rural areas, or varied between the tiers. The sub-category statistics are also examined to determine if differences are masked by variations within the rural groupings. Please refer to Appendix B – Tables of Statistical Findings, for a full listing of the detailed statistics, including the results for the sub-categories within the all-rural tier.

The report employs a statistical significance threshold of 95% confidence for testing differences between mean values for the rural and non-rural tiers. All differences reported are statistically significant at this 95% confidence level unless otherwise noted. All values reported (including graphs), and all examination of the relative differences between the tiers, are based on the mean values for each tier. This represents the most likely values for the statistic being discussed, though one must keep in mind that 95% confidence implies a non-overlapping range of values (confidence interval) around each mean in which the real value may vary. As such, the underlying difference between the means may be higher or lower than the value reported based on these confidence intervals. When the report states that the value in rural areas (say 15 deaths per 100,000) is 50% higher than the value for non-rural areas (10 deaths per 100,000 in this example), this is based on the simple ratio of the means.

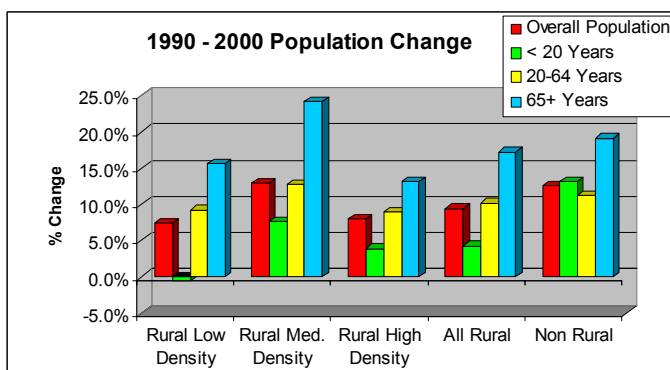
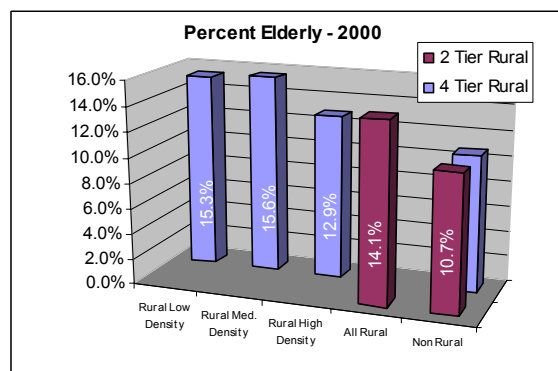
C. FINDINGS

1. Demographics

Demographic statistics examined are based primarily on the recently released 2000 US Census data (and trends from 1990). Demographic statistics do not directly describe the health of a population, but they are often highly correlated with health status, access, and outcome indicators. As such, understanding variations in demographics of the rural tiers is essential in reviewing the findings of the report, as well as in any planning efforts that may make use of the information presented. The findings of the demographic analysis highlight that the differences in the profile of the more and less rural communities in the state extend far beyond the simple density of the population living in these areas.

a. Age

One of the demographic characteristics with the greatest implications for health and health care is the age of the population. Elderly populations experience illness and utilize health services at a much higher rate than the non-elderly population and often require additional levels of support to facilitate access. Residents of rural areas of the state are 32% more likely to be elderly (65+ years) than residents of non-rural NH (14.1% compared to 10.7%). This difference is even more pronounced in the 2 most rural tiers, where the proportion is approximately 50% higher than in non-rural areas.



Looking at the trend in age data from 1990, it is also notable that the proportion of elderly grew at a much higher rate than the population overall. While this trend is true in the state overall, it is more so in rural areas. The elderly population in rural areas grew by 17.2% between 1990 and 2000. This is 81% faster than the overall population growth in those areas

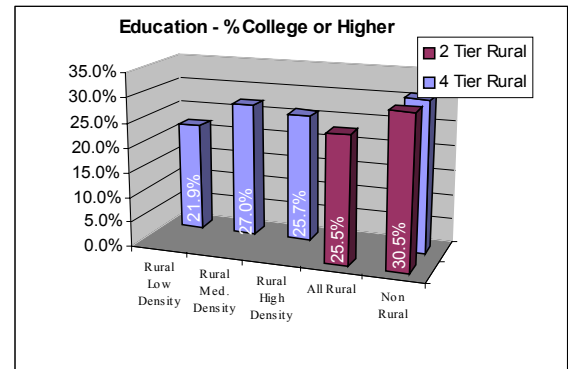
(9.5%). This compares to a 51% differential growth rate in non-rural areas (19.1% elderly vs. 12.6% overall). Perhaps more significantly, this differential is offset not by the adults (21-65 years) that make up the majority of the population, but rather by the population under 20 years old. The growth in the young population in rural areas was nearly 70% less than the growth in that group in non-rural areas (4.3% compared to 13.2%), and the absolute population under 20 actually declined slightly in the most rural parts of the state over the last decade. This large and growing proportion of elderly in rural areas will continue to place increasing pressure on the resources in rural communities. Because of the age variation in rural areas, age adjusting and age stratification is used, where possible, to mitigate the impact of age differences in the comparison of health statistics between the rural tiers.

b. Race/Ethnicity/Language

A single statistic was calculated for the proportion of all racial/ethnic minorities in the population. This includes all non-white, Hispanic-white, and mixed race individuals. The statistic shows that residents of rural areas of the state are half as likely to be of a racial/ethnic minority as non-rural residents (3% vs. 6% respectively). This is not comparable to 1990 statistics because of changes in the way the Census treats race. Similarly, the proportion of residents not fluent in English is half as large in rural compared to non-rural areas (1.5% vs. 3.0%).

c. Educational Attainment

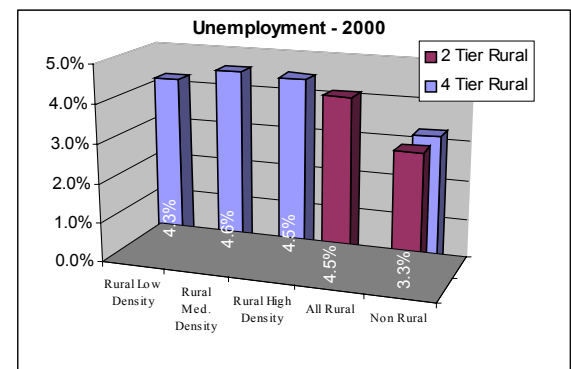
Another area strongly correlated with health status and public health concerns is educational attainment. Again there is a significant difference observed between rural and non-rural areas. Looking at the population over 25 years old for whom educational attainment is known, residents of rural areas are 20% more likely to have education below High School/GED level, 5% more likely to have a High School/GED education only, and approximately 15% less likely to have attained a Bachelor's level degree or higher. In the most rural tier, the difference is even more pronounced, with a 41% greater rate of sub High School education, and a 29% lower rate of college or higher education. These statistics showed a positive trend in the state overall compared to 1990, but the differences between rural and non-rural parts of the state remained nearly unchanged.



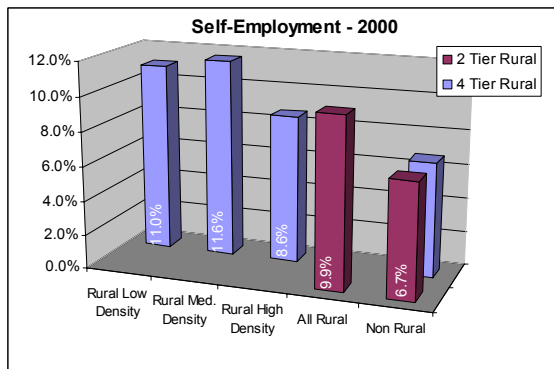
d. Employment

There are a variety of demographic statistics related to employment which impact health and particularly health care access.

Perhaps the most widely reported employment statistic is the unemployment rate, or percentage of individuals 'in the labor force' (able and willing to work) that are currently unemployed. While most would speculate that 2000 was a particularly good year for the state's unemployment rate (3.8% overall), there was a 35% higher rate of unemployment in rural areas (4.5% compared to 3.3% in non-rural areas). This rate was nearly consistent across all three of the rural tiers. It should also be noted that the years since the census have seen a downturn in the overall economy, with the state's most rural areas being heavily impacted by the high profile collapse of several paper mills and their supporting industries. Nationally, the unemployment rate grew from 4.0% to 5.8% between December of 2000 and 2001 according to the Kaiser Family Foundationⁱⁱ. Unemployed individuals typically cannot afford health insurance. Some may qualify for Medicaid, but many are reluctant to seek such assistance, particularly if unemployment is viewed as a short-term situation. The Kaiser Family Foundation found that public insurance rates rise as employment falls, but "not enough to fully cushion the impact of falling employer coverage".



In addition to those that are unemployed but in the 'labor force', adult residents of rural areas are also 16% more likely to not be in the labor force than residents of non-rural areas (32.2% compared to 27.9%). This statistic may be the result of the higher proportion of elderly in rural areas, but the statistic was not available broken down by age.



Self employed individuals/family workers (defined by Census as those that work for themselves or their family in a non-incorporated business) typically cannot access group rate insurance and must purchase more expensive individual plans which are often not affordable. Residents of rural NH are nearly 50% more likely to be self-employed (9.9% of workers compared to 6.7% in non-rural areas). Self-

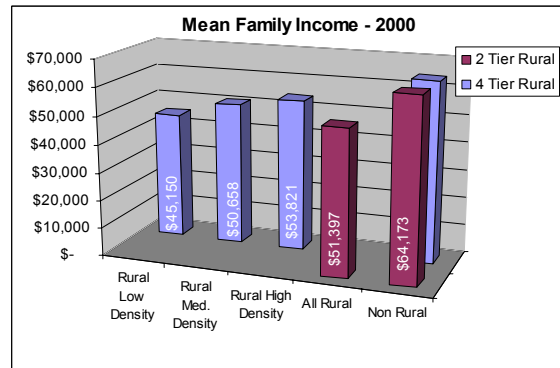
employment represents more than 11% of workers in the two most rural tiers of the state.

An individual's occupation is also important as it is often linked to whether or not health insurance is offered through the employer. Compared to those living in non-rural areas, residents of rural NH are 21% more likely to hold Service related jobs, 31% more likely to hold Construction/Maintenance jobs, 18% more likely to be in Production/Transportation jobs, and more than 3 times as likely to be in Farming/Fishing/Forestry (though this category is a small portion of overall employment). These occupations are typically less likely to offer employer sponsored health plans compared to Management/Professional jobs, which rural residents are 15% less likely to hold, or Sales/Office jobs, which rural residents are 10% less likely to hold.

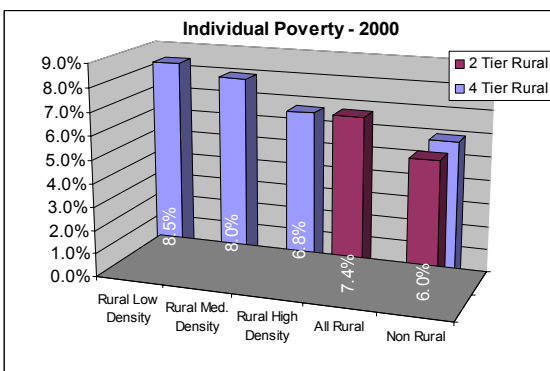
e. Income/Poverty

Personal and family means is another area closely related to health care access. Persons of low income typically have less resources available to spend on health services. On the other hand, public insurance programs, such as Medicaid and the State Children's Health Insurance Program (SCHIP), are means-tested based on family poverty criteria, and may result in somewhat better access than those that do not qualify and are otherwise uninsured. Rural residents tend to have lower incomes and are more likely to qualify as being in poverty. Nationally, 36% of the non-elderly uninsured in 2000 were below poverty, and an additional 28% were 'near poor', with incomes below 200% of the federal poverty level.ⁱⁱⁱ

In New Hampshire, average family income in rural areas was approximately \$51,000 in 2000, which is nearly \$13,000 or 20% less than in non-rural areas (\$64,000). The statistic further varies within the rural tiers, with the most rural areas averaging \$45,000 per family. Similarly, per-capita income in rural areas is approximately 14% lower than in non-rural areas (\$21,700 compared to \$25,100). On the positive side, per-capita income for 2000 was up sharply in the state overall compared to 1990 with a 15% greater rate of growth in rural areas as a percentage of 1990 income (50.8% vs. 44.2% in non-rural areas).



Poverty status thresholds are adjusted annually, and factor in the size of each family unit along with the income generated. They do not, however, factor in variation in cost of living between different areas (see discussion under 'Housing' below). Poverty overall is more prevalent in rural areas of the state, where 4.7% of families and 7.4% of individuals are in poverty, compared to 4.0% of families and 6.0% of individuals in non-rural areas. While these differences may seem small in absolute terms, they represent a 16% greater likelihood of family poverty and a 23% greater likelihood of individual poverty in rural areas. Both of these statistics also exhibit a strong pattern within the rural tiers, with the low density rural tier showing poverty rates well above those of the high density rural areas (5.7% for individuals and 8.5% for individuals). Interestingly, increased poverty in rural areas overall is not the result of the larger elderly population in those areas. For



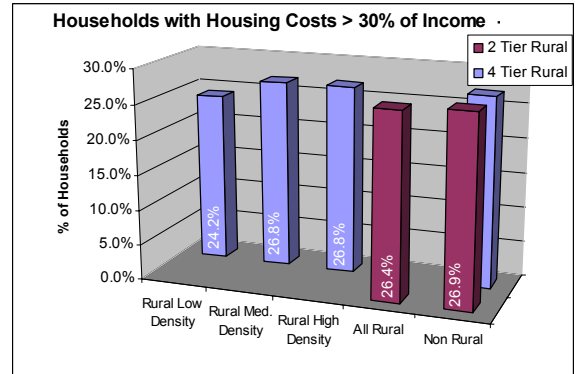
individuals over 65 years old, the poverty rate in rural and non-rural areas is nearly identical (approximately 7.2%). For individuals and related children under 18 years of age, the poverty rate in rural areas is 21% higher than that of non-rural areas. For families with children under 5 years old, poverty is 37% more likely in rural areas (10.9% vs. 7.9%) with a strong pattern across the rural tiers (low density rural = 12.6%).

In a somewhat related statistic, many households rely significantly on sources of income that are not related to employment, including state and federal programs and personal savings. Some are highly correlated with the increased elderly population in rural areas (which cannot readily be controlled for in these statistics). Rural households are 32% more likely to have Social Security income and 19% more likely to have retirement income than non-rural households, with an even greater difference in the most rural tiers. Similar patterns, however, exist in the income categories that are less related to age. Rural households are 23% more likely to rely on Supplemental Security Income ('SSI':

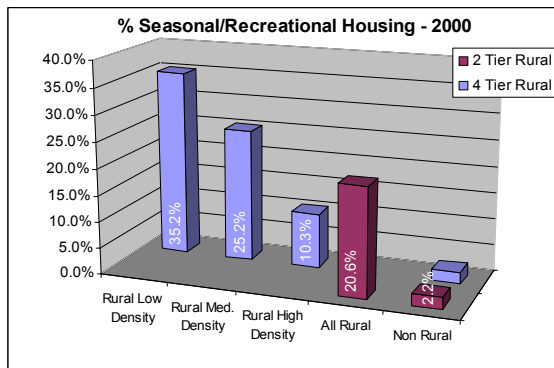
financial assistance for needy aged, blind, or disabled individuals), and 29% more likely to receive public assistance income than households in non-rural parts of the state.

f. Housing

It is often speculated that a lower cost of living mitigates the impact of lower income in rural areas, and this appears to be correct to some degree. Looking at the statistic which relates housing costs to household income, one sees no statistical difference between rural and non-rural areas, in the percentage of households where these costs exceed 30% of total income. It is noteworthy that housing costs are high in all areas of the state, with approximately 27% of households overall, and 35% of renter occupied households, spending more than 30 percent of total income on housing alone. Also, while costs such as housing may be lower in rural areas, health care related costs, such as insurance and prescription drugs, are often set externally and are less likely to vary with geographic location in the state.



Another housing related statistic with implications for the health care delivery system is the seasonal/ recreational housing rate. Rural areas of the state are popular year-round tourism and vacation destinations for out-of-state residents, as well as residents of non-rural parts of NH. The State Division of Travel and Tourism estimates that 27.5 million people visited the state in 2002. The proportion of seasonal/recreational housing in rural parts of the state is over 9 times as high as in non-rural areas (20.6% vs. 2.2% of all households).



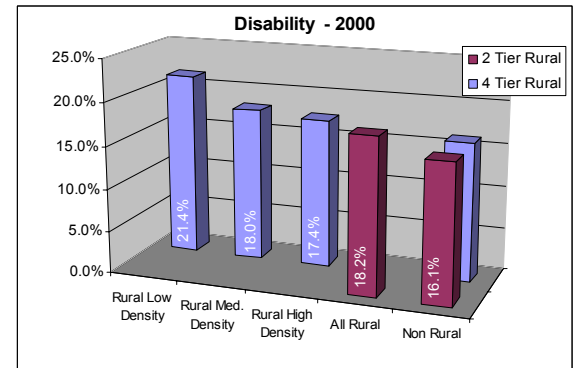
There is also a strong pattern in the seasonal/recreational housing rate within the rural tiers, representing 35% of housing in the most rural areas of the state (16 times that of non-rural areas). Along with tying the rural economy of the state to the highly variable tourism/vacation industry, high levels of tourism also have implications for the health care system. With one of every three housing units in the most rural areas dedicated to non-residents,

the health care system in these areas must maintain significant levels of additional resources to serve the non-resident population, particularly for non-routine care such as hospital, emergency, and EMS services.

Length of housing occupancy is a measure of how stable the population is, and rural populations show greater stability than residents of non-rural areas. Rural residents are 13% less likely to have moved into their current home within the last 5 years, however they were 20% more likely to have lived in the same home for 10-20 years, and 16% more likely to have lived in the same location for over 20 years.

g. Disability

Disability is measured by the Census based on both physical impairments/limitations and on the inability to work for those of working age. It is the only demographic measure gathered by the Census that is directly health related. Rural areas of the state show a 13% higher rate of disability than non-rural areas. Interestingly, both the elderly and the young (age 5-20) population in rural areas do not show any statistical difference in their rates of disability between rural and non-rural areas (38% and 8.5% respectively). The adult population (21-64 years), however, does show a 13% higher disability rate in rural areas (17.4% vs. 15.3%). Since adults represent over 60% of all disabilities in rural areas, this statistic is not simply related to the higher proportion of elderly in rural areas.



h. Transportation

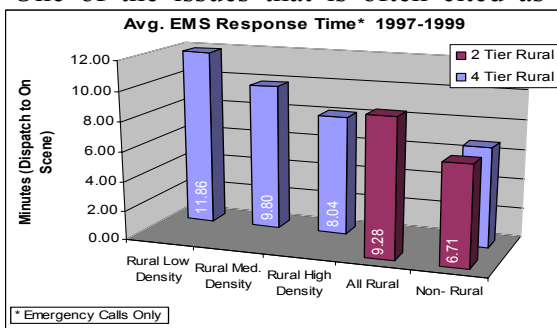
Lack of vehicle availability showed no statistically significant difference between residents of rural and non-rural areas of the state (just under 6% for both). Because of the availability of public transportation in the 'urbanized' areas, one might assume that there would be less vehicle ownership in the non-urban tier but this does not appear to be the case. The lack of a vehicle in rural areas may present more of a barrier due to the physical distances between people and resources, as well as the relative lack of alternatives such as taxis and busses.

In terms of commuting time (for those who work away from their home), workers in both rural and non-rural areas of the state report spending approximately the same amount of time, 25 minutes, travelling to work.

2. Health Services / Access

a. Emergency Medical Services (EMS)

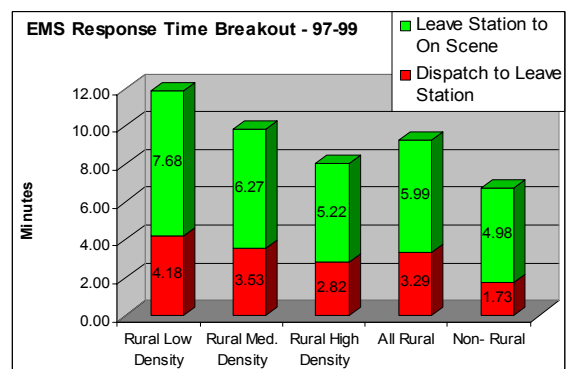
One of the issues that is often cited as a challenge in rural areas is the staffing and maintenance of the EMS system. The Medicare Rural Hospital Flexibility legislation (Section 4201 of the Balanced Budget Act of 1997, Pub. L. 105-33), enacted to support small rural hospitals through Critical Access Hospital designation, specifically identifies improving and integrating the rural EMS system as one of the goals of program.



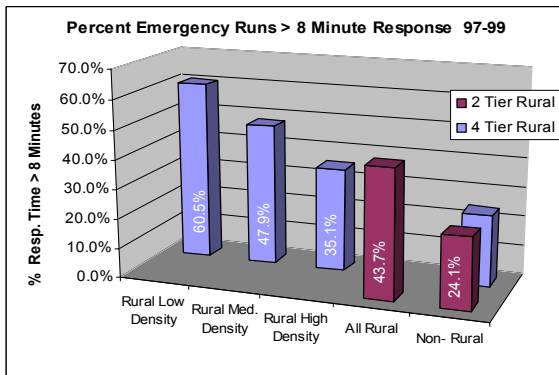
Differences in the EMS system between rural and non-rural areas were explored through analysis of the database of EMS runs in the state (all runs 1997 - 1999 supplied by the NH Department of Safety). While this approach cannot shed light on underlying structural/financial issues such as staffing and training, or equipment purchases and management of volunteer squads, it can describe differences in the use of the system and the system outputs in terms of response times.

Response times to calls of an emergency nature showed statistically significant variation across the rural tiers. Response time was examined in two different but related ways: 1) the average response time of all emergency runs, and 2) the fractile response time, which looks at the proportion of runs that arrive within a certain acceptable period of time. Looking first at the average response time in rural areas of the state, one sees it is 2.57 minutes, or 38%, longer than in non-rural areas (9.28 minutes compared to 6.71 minutes in non-rural areas). The response time was significantly related to the level of rurality, with response time in each successive rural tier being statistically higher than that of the next tier. The average overall response time for the most rural tier was nearly 12 minutes, which is 5 minutes or 77% longer than in the non-rural areas.

The data permitted the total response time to be broken down into two very distinct intervals. The first is the interval between the time the first dispatch call goes out and the time the squad leaves the station. This interval is most impacted by the nature of the squads and their staff in terms of readiness of resources. The second interval measures the time it takes the squad to arrive on-scene after leaving the station. This interval is most impacted by physical



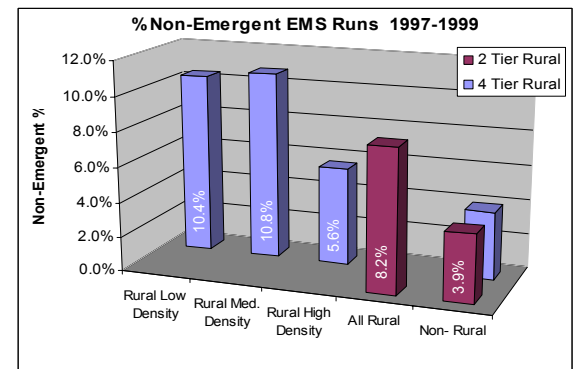
distance between the squad and the scene they are called to, as well as road and travel conditions. Exploring the components of this longer response time, it is clear that both the time to leave the station and the time to travel to the scene are factors in the overall difference observed. Interestingly, however, the difference is explained more by variation in the time to leave the station than by differences in the travel time to the scene, even though the latter represents the larger component of the total response time. Put another way, travel time from the station to the scene is only 20% (1.01 minutes) greater in rural areas, while time to leave the station is 90% greater (1.56 minutes) in rural areas. Time to leave the station represents 35% of the total response time in rural areas, compared to 26% in non-rural parts of the state. This suggests that greater opportunities to reduce disparities in response time in rural areas lie in the structure and staffing of rural EMS squads. The portion of runs covered by Mutual Aid (when a squad responds to a call in an area typically covered by a different squad for various reasons), which can be a factor in response time, was also 50% higher in rural areas, though they accounted for less than 1% of runs in any part of the state (.6% compared to .4% in non-rural areas). As such, reliance on mutual aid is not a key factor in explaining observed differences in response time.



The fractile method of examining response time is increasingly being used because it better highlights the proportion of runs that fail to meet a defined standard and reduces the impact of unusual situations. These issues can be masked by the large portion of runs that do meet the standard. The nationally accepted Fractile Response Time standard is eight minutes or less, 90% of the time^{iv}. While the difference of less than 3 minutes between rural and urban response

times may seem small, and even a nearly-12 minute average response time may seem acceptable, the picture is more striking when the 8-minute standard is applied. Here one sees that the 8-minute standard, set with cardiac life support needs in mind, is exceeded 24% of the time in non-rural areas, but nearly 44% of the time (or 80% more frequently) in rural areas of the state. This statistic masks an even more striking pattern within the rural tiers. In the most rural tier, the 8-minute standard is exceeded on over 60% of the emergency runs. This highlights the need for Automated External Defibrillators (AED's) in rural areas, as well as the general need to focus on emergency services in these communities

Utilization of the EMS system is also significantly different across the rural tiers of the state. Rural areas make much greater use of the system for non-emergent runs. Rural areas of the state are more than twice as likely as non-rural areas to use the EMS for a non-emergent run (8.2% of calls compared to 3.9% in non-rural areas). Non-emergent calls represent over 10% of coded calls in the 2 most rural tiers. This statistic is most likely tied to the need to transport patients to more intensive services available in the more urbanized areas, but may also reflect lack of transportation alternatives.



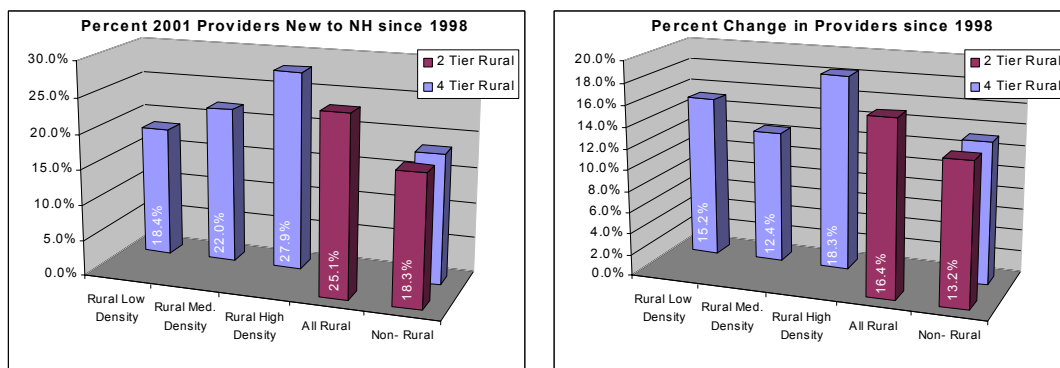
It is interesting to note that more than half (55%) of all EMS runs in the state are to rural areas, although these communities contain only 37% of the state's resident population. There are a number of factors that likely contribute to this pattern. Most notably, EMS squads do not serve only the resident population of an area, and rural areas of the state have a much higher proportion of non-resident visitors (up to one-third of the total population in the most rural areas based on the proportion of seasonal/vacation housing). It may also be speculated that these visitors tend to engage in higher risk activities (such as skiing, hiking, boating) when visiting. Also, the Census shows that residents of rural areas are older than those of non-rural parts of the state, and this population has a higher need for ambulance services. Lastly, there are approximately 1,700 more non-emergent EMS runs in rural areas each year than there are in non-rural areas (see above), which translates into about 4.5% of all rural runs. In general, these statistics highlight the

degree to which rural communities must support higher levels of EMS service than would be indicated by their population directly, and how rural EMS issues impact statewide EMS statistics disproportionately to the size of the rural population.

b. Primary Care Provider Stability & Migration

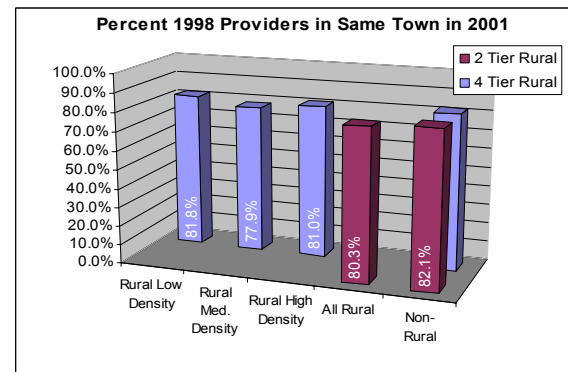
The impact of changes in the availability of primary care providers in rural areas is often cited as a major factor for access to and continuity of care in rural areas. By comparing the NH Board of Medicine's licensing list of physicians in the primary care specialties (Family Practice, General Practice, Internal Medicine, Pediatrics, and Ob/Gyn) over a 3 year period (1998 - 2001) one can examine the changes in the number of primary care providers in more and less rural parts of the state. While the provider licensing lists do not account for changes or underlying differences in work hours, or for practice in multiple locations, it is a reasonable basis for exploring physician movement overall.

In total, the primary care provider base grew significantly in all areas of the state. There was a net increase of 166 providers in the primary care specialties, or 14.5% of the 1998 provider population. The net positive trend in the primary care provider growth rate was 24% higher than the growth rate in non-rural areas, though this difference is not statistically significant with 95% confidence. The proportion of 2001 providers new to the state within the last 3 years, however, was significantly higher in rural areas, representing 25.1% of providers, compared to 18.3% in the non-rural part of the state. The growth in the rural primary care base, and the degree to which new providers are locating in rural areas are both positive trends for rural primary care access.



By matching the provider licensing numbers from 1998 to 2001, it is possible to test the stability of providers in a particular area by examining their licensed addresses. The data was examined to determine the proportion of providers that were located in the same town in both 1998 and 2001, as well as their movement between the different rural tiers. While there was a significant amount of change in the provider base over 3 years, provider stability was relatively uniform in the rural and non-rural areas of the state. Of providers that were practicing in NH in 1998, 81.4% were still located in the same town 3 years later. The figure for rural areas was 80.3%, while that of non-rural areas was 82.1%, and there was not a great degree of variation between the different rural tiers. Due to the influx of new providers, the retrospective stability of providers (portion of

2001 providers that were in the same town in 1998) is even lower, but still statistically constant between rural and non-rural areas. Overall 71.1% of the providers in 2001 were in the same town in 1998, with a rate of 69.0% in rural areas and 72.5% in non-rural areas.



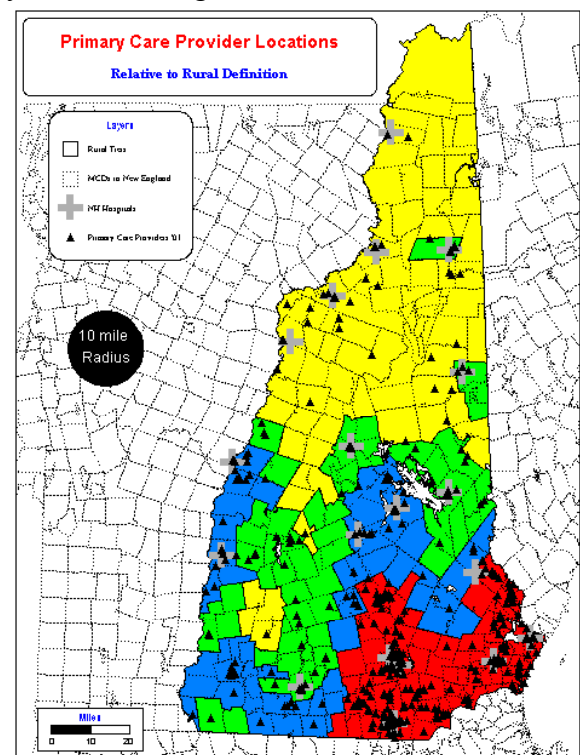
In terms of provider migration, of the 103

stayed within the same rural tier. Of the remainder that changed rural tiers, however, a higher number moved to less rural areas than those that did the reverse. This represents a very small proportion of total providers, however, and does not meet the test of statistical significance.

c. Primary Care Provider Ratios

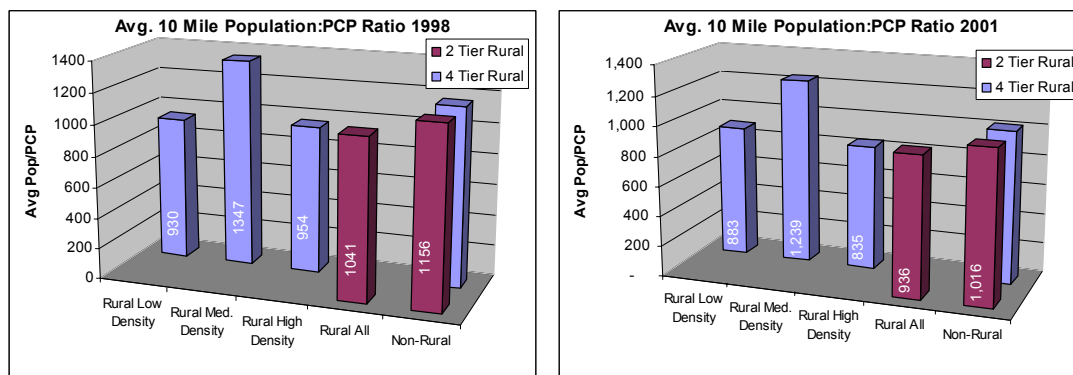
The most frequently used method of assessing the availability of primary care providers is to develop a Population-to-Provider ratio which describes the number of people served by each provider in relative terms. This is the method used by the federal Division of Shortage Designation to test the level of provider shortage for a Health Professional Shortage Designation (HPSA). There are two key difficulties in doing this uniformly at the statewide level. First, and most importantly, the data on providers must be adjusted to account for how many hours each provider practices (called Full Time Equivalent or FTE), and whether this time is divided amongst several locations. Such data is not available at the statewide level. The second difficulty is in defining ‘service areas’, as there is a high degree of variability in where any given person might travel to receive services. A Primary Care Service Area (PCSA) definition has recently been developed by the Health Resources and Services Administration (HRSA) and researchers at Dartmouth College, but the rural definitions were developed earlier and are not designed to conform to the PCSA boundaries.

As such, the relative availability of primary care providers in the rural tiers was assessed using the provider licensing list and 2000 census population. Each provider was counted at his or her licensed address only and it was assumed that, in aggregate, providers in the different tiers work similar hours. The service areas were drawn using the same method used to develop the population density for the rural definition: overlapping 10-mile radius areas around the center of each town. These areas were used to determine the number of people and providers within 10 miles of the center of each town

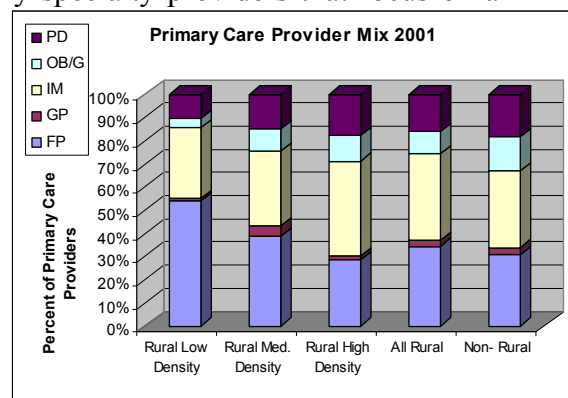


and a population-weighted average ratio was then calculated for each rural tier. Because the circles that define these areas overlap, these ratios cannot be compared numerically to the ratios at which federal shortage designations are created, but can be compared to each other.

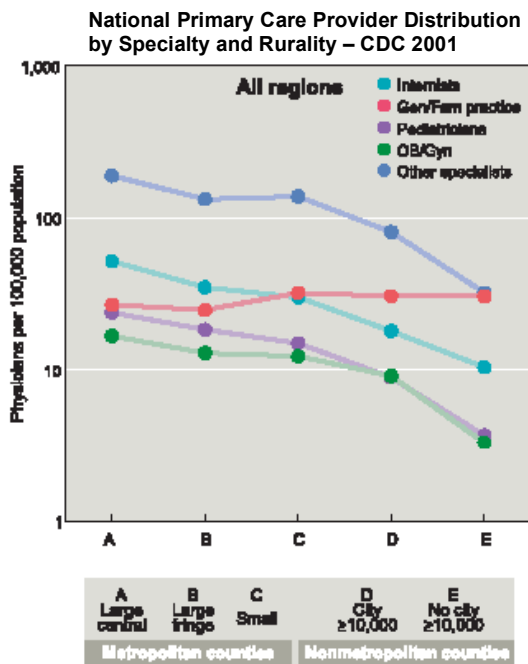
This ‘crude’ method of assessing provider availability shows a generally positive picture of primary care provider availability in rural areas. In total, the 2001 ratio for rural areas showed approximately 8% fewer residents per provider compared to non-rural areas (936 per provider in rural areas compared to 1,016 in non-rural areas). Looking within the rural tiers, however, one sees that the medium density rural tier has a substantially higher population:provider ratio than the other rural tiers. The ratio in this tier is, in fact, higher than the ratio in the non-rural tier by a factor of over 20%. A similar pattern is seen using the 1998 physician file. The reason for the notably higher rate in this rural tier is not readily apparent. It should also be noted that, while the proportion of providers per person does not appear problematic, there are far fewer providers in the most rural areas of the state, resulting in less choice and much greater sensitivity to the loss of individual providers and practices. It is also anecdotally believed that rural providers in the state are more likely to practice part time (due to a combination of age and lifestyle choices), and are more likely to practice in multiple locations. These factors cannot be accounted for in the study without a survey of all providers.



One additional aspect of the primary care provider base that can be assessed through analysis of the physician-licensing file is the relative ratio of the various specialties that comprise the primary care provider mix. Typically specialty providers that focus on a segment of the population (such as Pediatricians, Obstetrician/Gynecologists, and, to some degree Internists) are considered harder to attract and support in rural areas, compared to family practitioners that see a broader range of patients. This is primarily due to the lack of a critical mass of population located within a reasonable distance to the provider^v. While this pattern can be seen to some degree in the overall rural:non-rural ratio in the state, it is much more pronounced in the most rural regions. In the



most rural tier of the state, Family Practitioners comprise 54% of the primary care providers, compared to 31% in the non-rural tier.

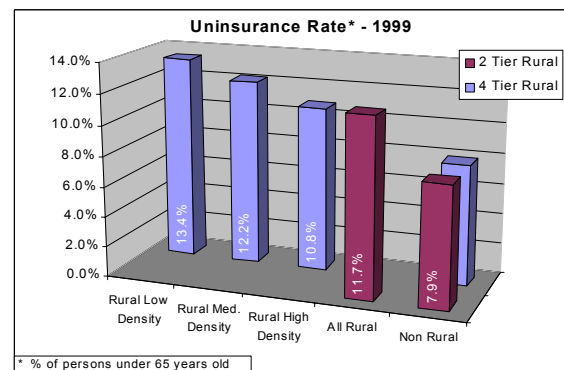


Conversely, Pediatricians and Obstetricians comprise 14% of the providers in the most rural tier, compared to 33% in the non-rural tier. The mix of providers in the least rural tier looks much more similar to the mix in the non-rural areas, muting the apparent pattern that exists as rurality increases. While overall primary care access appears comparable in rural areas, there is less access to Pediatric and Obstetrical/Gynecological specialists that may be necessary for more complicated medical conditions. These patterns are similar to those seen in primary care provider specialty mix nationally, as shown in the chart to the left^{vi}, keeping in mind that the rural:non-rural range in NH falls entirely within the B, C, & D categories from the national county-level definition used by the CDC.

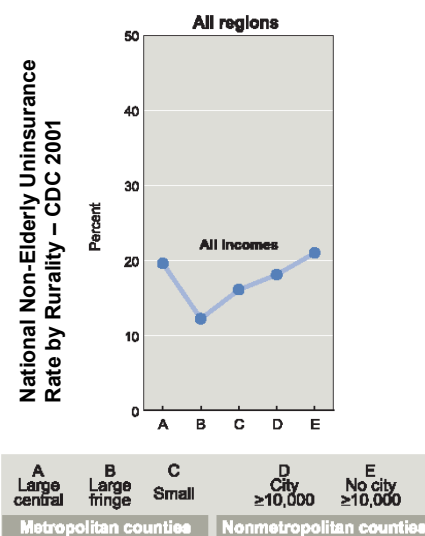
d. Health Insurance Coverage

Lack of health care coverage is perhaps the most often cited reason for disparities in health care access. Individuals lacking coverage, particularly those of low income, have a strong disincentive to using medical services and often go without needed health services, resulting in lack of preventive care and delayed treatment of health conditions^{vii}. It also places a financial burden on providers that care for those that cannot pay for their care, including community hospitals and health centers. The Healthy New Hampshire 2010 agenda sets a statewide goal of 100% coverage by the end of the decade^{viii}.

A survey, conducted by the State of New Hampshire's Office of Planning and Research in 1999, documented the health insurance picture of non-Medicare eligible residents in the state through a survey of approximately 12,000 households. The survey documented the health insurance status, and related factors, for all residents in the household. Because it is based on a sample, statistical power does not permit the results to be broken down beyond the consolidated (2-tier) rural definition for any measures beyond overall uninsurance rate.



The survey documents the fact that lack of health insurance is positively correlated with the rural nature of an area; becoming progressively higher across the more rural tiers. Overall, rural residents (under age 65) are 48% more likely to be uninsured than non-rural residents (11.7% compared to 7.9% in non-rural areas). The uninsurance rate is higher than the non-rural areas in each of the sub-sets of rural: 13.4%, 12.2%, & 10.8% in the low, medium, and high density tiers respectively. As noted in the section on demographics, there are several factors in rural New Hampshire that can be viewed as contributing factors to lack of coverage and financial barriers to care. These include lower income, higher rates of poverty, lower educational attainment, and higher rates of unemployment, self-employment, and employment in occupations that do not typically offer coverage as a benefit.



It should be noted that the uninsurance rate in NH is lower, overall, compared with national statistics, which place the overall statistic at approximately 17% for those under age 65 in 1999^{ix}. The overall rural/urban disparity, however, is much less pronounced than that seen in NH, with the national rates showing non-elderly uninsurance at approximately 19% of rural residents and 16% for urban residents. This may be due to the fact that NH has no counties with large metropolitan cities or counties without a town of at least 10,000, which represent the greatest and most comparable uninsurance rates found in the national urban/rural statistics, as shown in the chart to the left^x.

In terms of employment, the survey showed that the majority of uninsured residents are employed. Uninsured residents of rural areas were somewhat more likely to be employed compared to uninsured residents of non-rural parts of the state (59.7% compared to 54.5% in non-rural areas). It should be noted that the corollary to the 'employed' statistic cannot be directly compared to the unemployment rates in the Census section because the survey included those 'not in the labor force' in the definition of 'not working'.

Looking further at the working uninsured, the survey shows that, in rural areas, 67.1% of the working uninsured do not have an employer sponsored option, compared to 56.9% in non-rural areas. Again, this difference is likely tied to the nature of the jobs held by rural residents as discussed in the Census data.

In addition to a greater proportion of uninsured residents, rural areas also have a greater proportion of individuals on public insurance (primarily Medicaid - Healthy Kids). While public insurance does cover a range of basic health services, many providers elect not to accept this coverage, for a variety of reasons, making it more difficult to find a willing provider. In rural areas of the state, 8.3% of residents had publicly funded

insurance in 1999, compared to 6.4% in non-rural areas, representing a 30% difference in the rate.

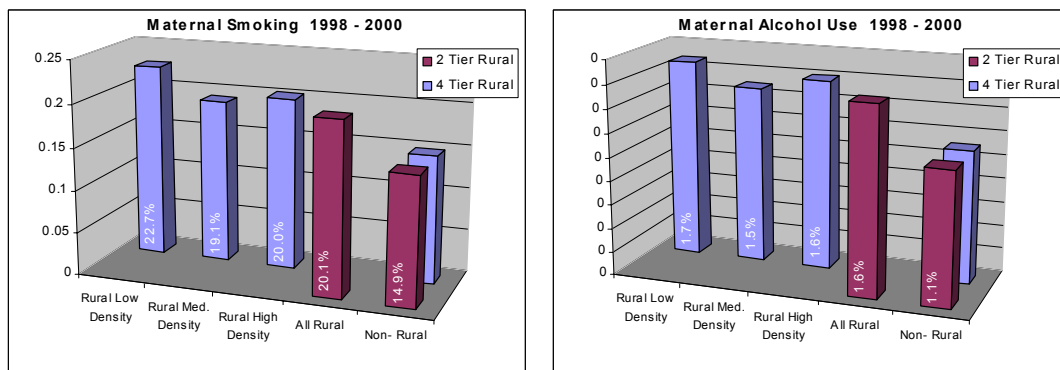
3. Health Status / Outcomes

The health statistics presented in the following section are based on data collected and reported by the NH Bureau of Health Statistics. Where available, the data were reported for two aggregated time-frame groupings. The first, data from 1993-1997, was derived from the Primary Care Access Dataset (PCAD) which compiled selected statistics from a variety of underlying data sources. The second grouping, 1998 - 2000, was taken directly from extractions of the underlying databases, including the state birth records, death records, and hospitalization file. Additional data were also taken from newly available data sources, such as the hospital ambulatory care dataset which reports on emergency room utilization.

a. Births

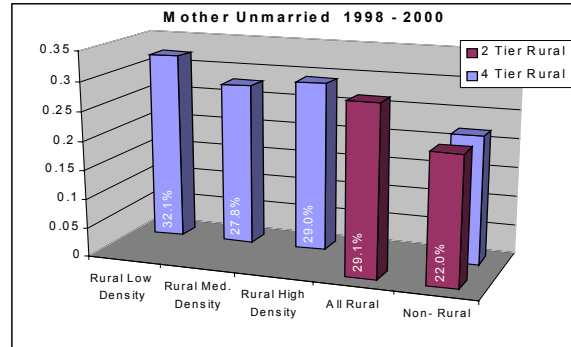
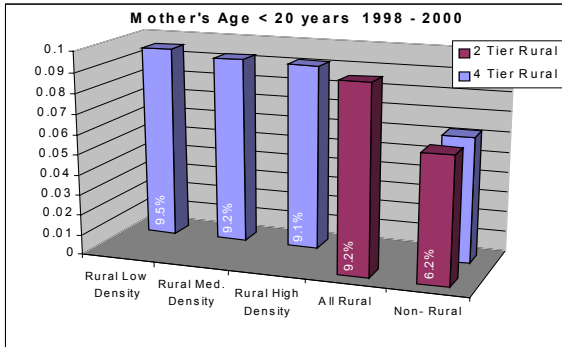
Birth statistics are derived from the state's birth records. Birth statistics in the northeastern United States tend to be quite favorable compared to other areas of the country and this is true in all areas of New Hampshire. Birth statistics can be broken down into several domains including maternal behavior, maternal demographics, prenatal care, and outcomes. In general, rural areas showed adverse statistics pertaining to maternal behavior and demographics, but equal to favorable prenatal care statistics and equivalent outcomes when compared with non-rural areas.

Maternal smoking during pregnancy was found to be persistently and significantly higher in rural areas compared to the non-rural part of the state. During 1998-2000 expectant mothers in rural were 35% more likely to have smoked during pregnancy compared to mothers in non-rural areas of the state (20.1% vs. 14.9% respectively). These statistics are nearly identical to the maternal smoking statistics from the 1993-1997 data. Maternal alcohol use, though much less prevalent, was also higher in rural areas (1.6% of births, compared to 1.1% in non-rural areas). Although both of these findings meet the 95% confidence test of statistical significance, the NH Bureau of Health Statistics cautions that

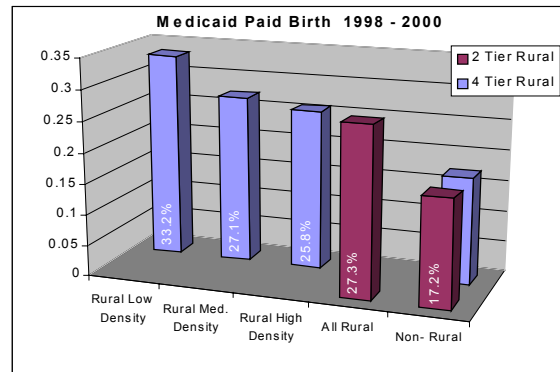
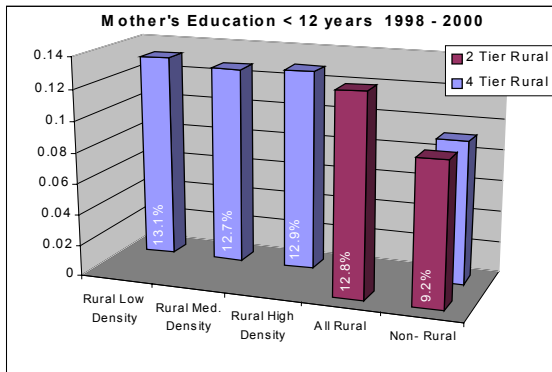


the reporting of the maternal alcohol use on birth records may be of questionable reliability.

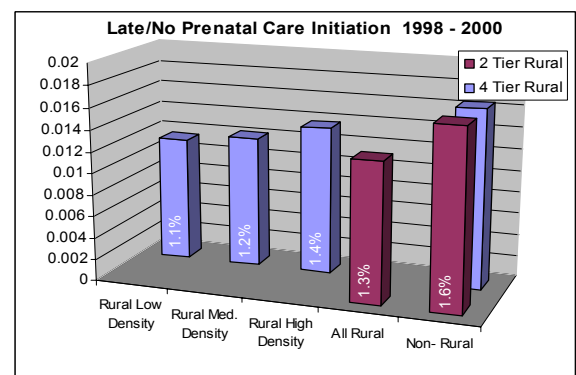
There are also a number of inter-related demographic characteristics that are considered risk factors around pregnancy. The proportion of births to teen-aged mothers was nearly 50% greater in rural areas compared to non-rural areas (9.2% compared to 6.2% respectively). Births to unwed mothers were over 30% higher in rural areas (29.1% vs. 22.0% in non-rural areas).



The proportion of mothers with educational attainment below the High School level was similarly adverse in rural areas (12.8% vs. 9.2% in non-rural areas). Lastly, Medicaid paid births, a proxy for low income of the family, were nearly 60% greater in rural areas (27.3% compared to 17.2% in non-rural areas). The Medicaid payment rate was greater in the more rural tiers, with Medicaid being the principal payor for 1 in 3 births in the most rural areas of the state. All of these statistics were similar to those observed for the period 1993-1997.



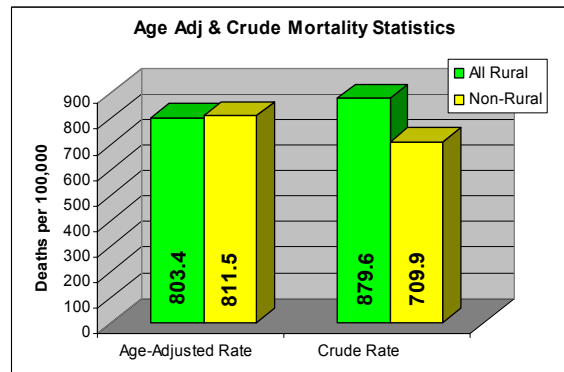
In contrast, there was a notable improvement observed in the initiation of prenatal care in rural areas. During 1998-2000 1.3% of women in rural areas had late entry into prenatal care. This figure is statistically lower than the 1.6% observed in non-rural areas. It is also down from the 1.9% seen in rural areas during 1993-1997, reversing the negative pattern for this prenatal care statistic in rural areas seen during the earlier period. One must keep in mind that these are very low numbers overall.



Emphasis on, and access to, prenatal care may be one factor that explains the comparable birth outcomes observed in rural areas, despite the adverse behavioral and demographic characteristics for births in rural areas. The rates of low birth weight, low gestational age (prematurity), and infant mortality are all statistically comparable between the rural and non-rural parts of the state.

b. Mortality

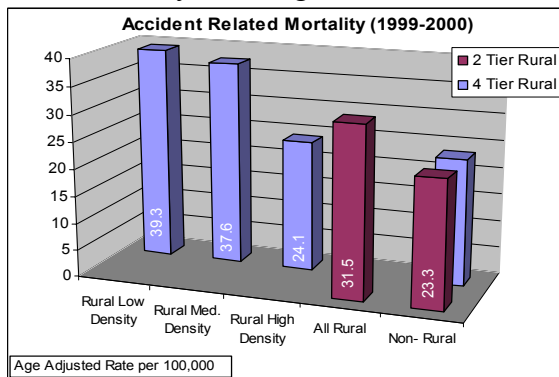
Differences in mortality statistics represent the ultimate outcome of underlying differences in disease/injury rates (due to a wide variety of factors) and/or in the quality and accessibility of health care services available to respond. The statistics are derived from death certificates issued throughout the state, which capture the internal (such as heart disease) or external (such as auto accidents and gunshots) cause of death. Because the risk of dying increases dramatically in the elderly population and this group is over-represented in rural areas, it is important to use age-adjusted statistics to examine the disparities in the rural tiers. It is also important to keep in mind, however, that the ‘age adjusted’ rate is simply designed to eliminate the real impact of age differences in the population for the purposes of research. It is the ‘crude rate’ that actually represents the health burden on the population in an area and the level of services needed to respond to it. As the chart to the right shows, there are not significant differences in the overall mortality rate between rural and non-rural areas once the statistics are age adjusted, however there is a real and statistically significant difference in the crude mortality statistic (24% higher in rural areas).



Comparable statistics were tested for all major internal and external causes of death. A similar pattern to the overall mortality rate, with statistically similar age-adjusted rates but significantly higher crude rates in rural areas, was observed in a number of categories, including the three largest categories of mortality: heart disease, cancer (malignant neoplasm), and cerebrovascular disease. For each of these causes of death, the rates are nearly identical between rural and non-rural areas once age adjusted, but the crude rate is 27-29% higher in rural areas. The only category in which rural areas showed a statistically lower mortality rate was septicemia, but this represents a very small proportion of total deaths.

The one exception, where rural areas showed a statistically higher age adjusted (and crude) rate was accidental deaths. Even after age adjusting, the accidental death rate in rural areas of the state was 35% higher than in non-rural areas. The crude rate is nearly 50% higher in rural areas. This statistic also appears to be correlated with increasing rurality in the state. The age adjusted accidental death rate in the most rural parts of the

state is nearly 70% higher than in the non-rural areas. These findings are consistent with



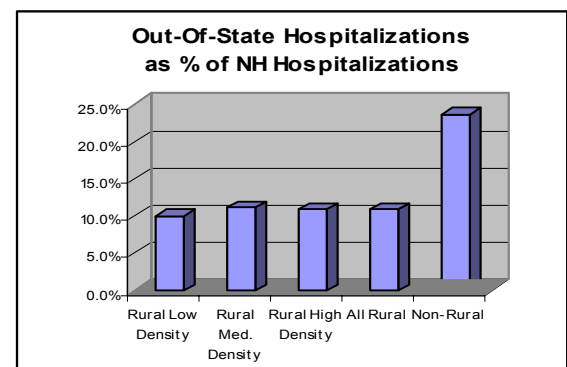
statistics from the earlier period of PCAD data (1993-1997). They also mimic national statistics which show the age-adjusted unintentional injury death rate increases strongly as counties become less urban^{xi}. The differences in accidental death rates may be explained by the nature of rural life and activities, as well as the occupations of rural residents. The differences in the national statistics are largely attributed to higher rates of motor

vehicle fatalities, but it is unclear (based on 1993-97 PCAD statistics) if this holds true in NH due to lack of statistical power. The Healthy New Hampshire 2010 agenda sets several related goals, including reduction of deaths from falls, motor vehicle accidents, and firearms (though this last category is more related to assault and suicide).^{xii} It should be noted that, because the overall age adjusted death rates are comparable between rural and non-rural areas, the statistically significant difference in this category is offset by positive rural outcomes in other categories which did not meet the test of statistical significance.

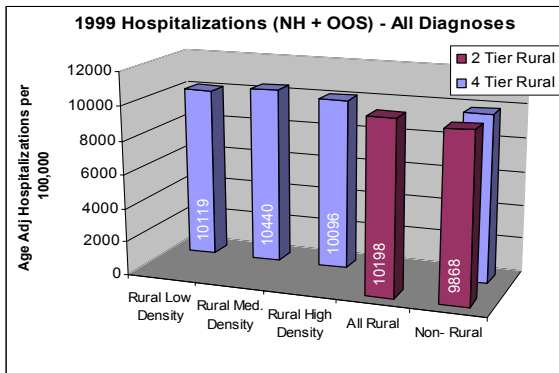
c. Hospitalization

Hospitalization rates are derived from the state's inpatient discharge database. The diagnoses are likely more accurate than those on death records because they are based on more complete medical information. They are also more sensitive to underlying rates of disease/injury than mortality statistics because deaths are often averted by medical treatment. Hospitalization records were analyzed using the PCAD measures for the 1993-1997 period and through direct analysis of the hospitalization database for the 1998-2000 timeframe. Although extensive analysis of the data is presented in the attached tables, it was determined that an underlying gap in the data has a strong rural / non-rural component, making it difficult to discern the validity of many of the differences observed. The issue involves the fact that the state's records do not include hospitalization of NH residents in facilities located in neighboring states. The Bureau of Health Statistics is presently negotiating data sharing agreements with neighboring states to account for this in the future, but data is not presently available in a standard format for analysis. A crude count by age in 1999 was obtained from neighboring states to test the influence of out-of-state (OOS) hospitalization on this analysis.

Analysis of the 1999 records shows that OOS hospitalization was much more prevalent in the non-rural area of the state compared to all rural areas. This is due to the fact that the non-rural area is quite compact, and is located adjacent to areas of Maine, and particularly Massachusetts, that have significant



inpatient services available. Out of state hospitalizations account for 20% of all hospitalizations in non-rural areas, compared to 10% in rural areas. The impact of this is compounded when viewed as a portion of in-state NH hospitalizations (those available for detailed analysis) only. As the chart shows, when viewed in this way, OOS hospitalizations account for nearly 25% more hospitalizations than are included in the NH database, compared to about 10% each of the rural tiers. While this is problematic for the analysis, it demonstrates that non-rural residents of the state have a much greater level of hospital services available even beyond NH borders, and highlights the importance of preserving the state's rural hospital infrastructure.

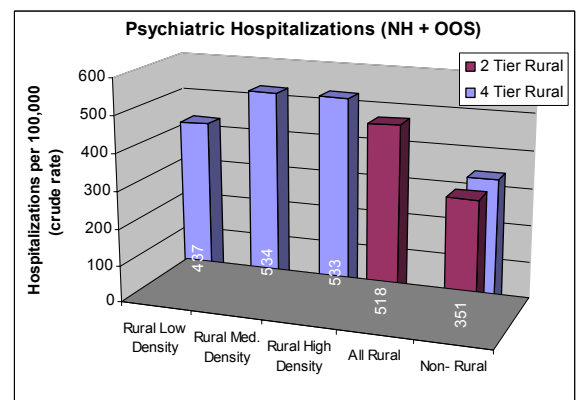


It was possible, by incorporating the 1999 data from surrounding states with averaged 1998-2000 NH data, to develop a corrected age adjusted rate for total hospitalizations (all diagnoses). The result was a small, but statistically significant, 3% greater age-adjusted rate of hospitalization for residents of rural areas compared to non-rural residents. Though numerically small, the difference (10,198 admissions per 100,000 rural residents vs. 9,868 per 100,000 non-

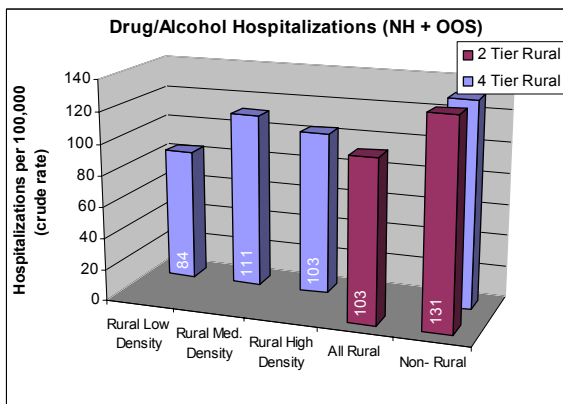
rural residents) would account for over 1,500 additional hospitalizations in rural parts of the state each year not related to age differences in the population. It should be noted that, nationally, among men and women ages 18–64 years, age-adjusted hospital discharge rates, excluding maternity cases, were considerably higher among those living in non-metro compared to those living in metro counties^{xiii}.

As noted with the mortality statistics, one must keep in mind that the age adjusting process is a research technique used to mitigate the real impact of differences in the age profile in rural areas, and the resulting need for services. The 'crude' difference in the overall hospitalization rate (including out-of-state services) is an 11% greater rate of hospitalization for rural residents. This emphasizes the critical role of rural hospitals in general, and the additional level of reliance that the elderly residents of rural areas place on them.

One area where the rate of hospitalization showed a dramatic difference between rural and non-rural areas was psychiatric admissions. Because of this, and because age adjusting has little impact on this statistic, it was possible to obtain out-of-state numbers to correct the statistic for comparison purposes. The crude rate of Psychiatric admissions for rural NH residents (including 1999 OOS admissions with averaged 1998-2000 NH data) is 518 per 100,000 compared to 351 per 100,000 in non-rural areas; a 48% greater rate.



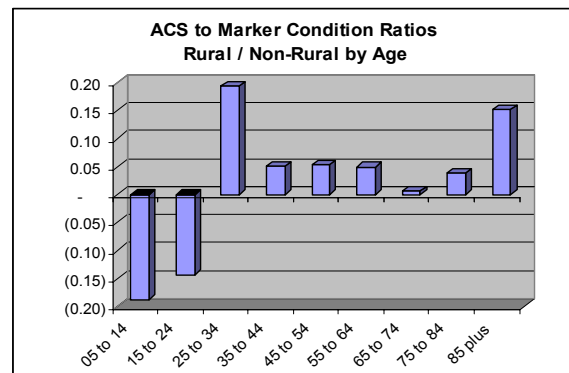
One possible explanation for higher mental health admission rates that has been discussed is the greater difficulty in managing mental health issues in the community setting due to lack of provider resources and isolation. To explore this concept, an average length of stay statistic was obtained for psychiatric admissions, which showed that rural psychiatric admissions stay an average of 6.6 days, compared to 7.8 days in non-rural areas (17% fewer days). The shorter average length-of-stay tends to support the concept of managing less complex conditions in an inpatient setting in rural areas. By multiplying the greater admission rate by the shorter length of stay, we see that average mental health admission days in rural areas are still 21% higher than in non-rural areas.



A similar correction can be made for OOS admissions of NH residents for Drug & Alcohol related treatment to obtain crude rates. Here one sees that residents of rural areas show a dramatically lower rate of hospitalization compared to residents of non-rural areas of the state. The crude rate of admissions for Drug and Alcohol treatment in rural areas was 103 per 100,000. This is 22% lower than the average rate of admission in non-rural parts of the state (131 per 100,000). Unlike the Psychiatric admissions described above,

there was no meaningful difference between the length of stay for rural and non-rural Alcohol/Drug admissions (mean of 3.7 and 3.8 days respectively).

Another way in which hospitalizations can be used to explore access to more basic care is through the use of Ambulatory Care Sensitive (ACS) diagnoses. These are a set of conditions for which research has shown that proper primary care management can greatly influence the rate of hospitalization. By looking at the ratio of ACS admissions to 'Marker' admissions (which are shown not to be influenced by access barriers), one can see the potential impact of primary care access.



Overall, the ACS:Marker ratio for rural and non-rural areas is not statistically different. When one looks at the statistic by age category, however, there appears to be an age-related pattern (though not statistically significant for each age category), showing fewer ACS admissions per marker admission for young people (< 24 years) in rural areas, and a reverse pattern for the middle age and elderly. This could theoretically be a result of the higher enrollment in Medicaid in rural areas, which primarily provides access for children.

A variety of other diagnostic categories of hospitalization were examined and found to be statistically different based on NH admissions only, but information was not available to

correct the numbers for the influence of out-of-state admissions. As such it is not possible to attribute the observed differences to factors related to the rural nature of the area, however the results are included in the attached tables.

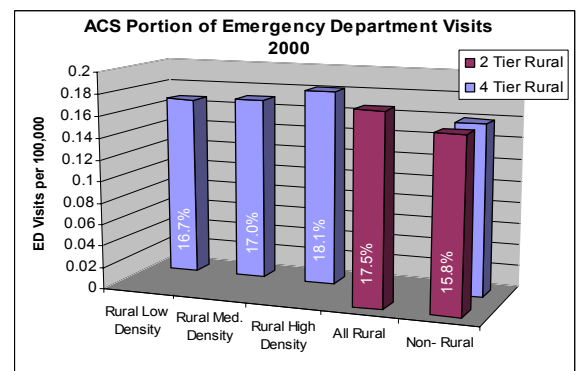
A final area of comparison using hospitalization is in the payor mix for admissions. For this comparison, it is important to draw a distinction between persons over 65 and others, due to the impact of Medicare on the elderly payor mix. For those under age 65, Private Insurance is the dominant payor of hospital services, but is a statistically lower proportion in rural areas (65% of admissions, compared to 72% of non-rural admissions). This finding tracks with the overall finding of lower rates of insurance in rural areas of the state. This difference is made up largely by increased reliance on Medicaid, and, to a lesser degree, Medicare (for under age 65), and self-pay (uninsured). Interestingly, when the insurance mix of the full population (regardless of age) is considered, the portion of admissions related to uninsured individuals is equal between rural and non-rural areas. This results from the higher uninsurance rate being offset by greater access to public Medicaid and Medicare programs due to the higher elderly and low-income populations in rural areas.

d. Emergency Department Utilization

The database of Emergency Department (ED) discharges for NH (separate from outpatient discharges overall) is a recent addition to the state's available data sets, and only 2000 data are available for this analysis. These statistics are important in that the ED often represents the only alternative available to individuals experiencing access barriers to routine primary care.

Looking at overall use of the ED, one sees a 12% greater rate of utilization in rural areas compared to non-rural parts of the state (12,708 visits per 100,000 compared 11,358 per 100,000 respectively). Like the hospitalization database, the data available pertain only to NH residents seen at facilities located within the state. Although it is theoretically less sensitive to access at out-of-state facilities than hospitalizations, due to the emergent nature of the conditions, it is likely that there is still some bias introduced by greater availability of ED resources in the states bordering the non-rural area of NH compared to the rural parts of the state. Unlike the hospitalization records, however, there are no statistics available to test this assumption, or to quantify or adjust for the impact. As such, this statistic should be viewed with some caution.

Statistics were also gathered on the use of the ED for Ambulatory Care Sensitive (ACS) diagnoses, to test the crucial question about primary care access issues. The ED data is theoretically more sensitive than hospitalizations to exacerbated ACS conditions (such as asthma), which may not require admission but which still constitute poor primary care management of the condition. Here we see that ACS diagnoses represent a greater proportion of ER visits in rural



areas compared to non-rural parts of the state (17.5% compared to 15.8% respectively). There is no reason to believe that ACS admissions, examined as a proportion of all ER admissions, would be impacted by any differences in the out-of-state hospitalization rates the rural tiers.

Lastly, by examining the payor mix in the ED, one can examine the issue of financial bias in terms of access. If one looks at ER visits for those under 65 years old, the payor data can be compared to the results of the NH insurance survey. If one assumes that there should be no greater demand for emergency medical services for persons in any particular payor category, one might expect the payor mix to mimic that of the population overall. Instead, what one sees is that Medicaid and Uninsured individuals represent a disproportionate share of cases in all areas of the state. In rural areas, 35% of ED visits for persons < 65 years are for Medicaid or uninsured patients, while these groups represent only 20% of the population in that age range. Interestingly, the disparity between these proportions is even more pronounced in non-rural parts of the state, where Medicaid and uninsured individuals represent 32% of the ED cases, but only 14% of the population. This implies that primary care may be more accessible to Medicaid and uninsured individuals in rural parts of the state compared to non-rural areas.

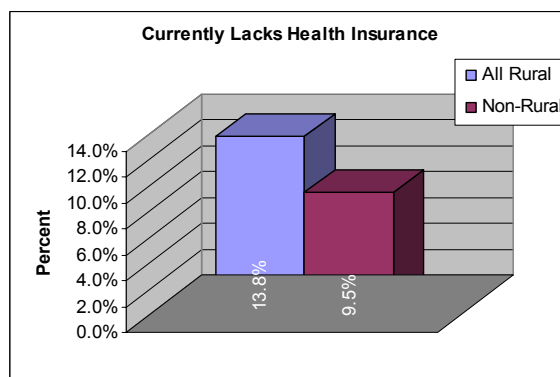
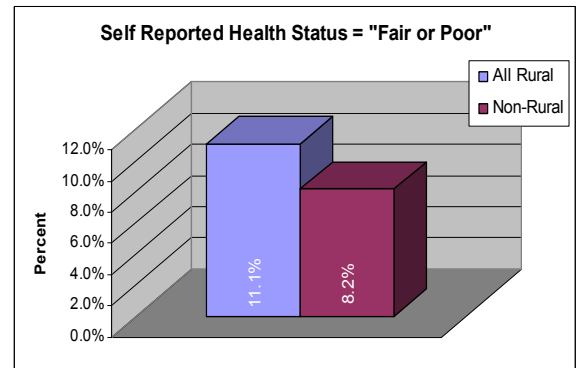
e. Behavioral Risk Factor Surveillance System (BRFSS)

There are a variety of fundamental health indicators for which population-based statistics cannot be derived from existing secondary data sources such as mortality and hospitalization. These include such basic measures as a person's overall health status, utilization of primary and preventive care services, disease prevalence, and a range of personal health-related behavioral factors (such as smoking and exercise) that can greatly influence a population's health profile and need for health services. Since the mid 1980's, the federal Centers for Disease Control and Prevention (CDC) has been monitoring such factors through a nationwide survey called the Behavioral Risk Factor Surveillance System (BRFSS). While this survey includes respondents from each state, the sampling size from any given state was not sufficient for sub-state analysis. In the 2001 implementation of BRFSS surveys the NH Bureau of Health Statistics and Data Management elected to greatly expand the sampling in the state to allow for sub-state analysis. The 2001 sample in NH included 4,068 responses, which was sufficient for analysis of differences between responses from the rural and non-rural areas of the state, though not within the sub-tiers of rural. Also, for conditions that affect a small portion of the population, some real differences in the groups may not meet the 95% confidence test due to the size of the sample. Also, the BRFSS is only asked of residents that are 18 years of age or older. A Youth Risk Behavior Surveillance Survey (YRBSS) is conducted as well, but the sample is not sufficient to support sub-state analysis. The results presented here are weighted to the age mix within each rural tier, but are not age adjusted. Data is weighted to reflect U.S. Census age and gender parameters, as well as a selection probability factor that accounts for sampling factors such as multiple phone and multi-adult households. Because these statistics are not age adjusted, one must keep in mind the potential impact of the age differences between residents in rural and non-rural

parts of the state on the responses given, as many of these factors tend to be correlated with age.

Rural and non-rural statistics were produced for 42 of the key questions (or derived measures such as obesity) included in the BRFSS survey. The full list of items topics examined, and the responses considered to be of interest, is included in the attached tables located in Appendix B. While a number of key questions showed significant differences between rural and non-rural areas, the majority of measures were not significantly different between rural and non-rural areas.

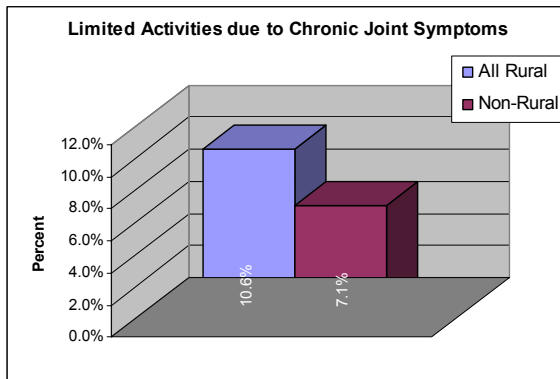
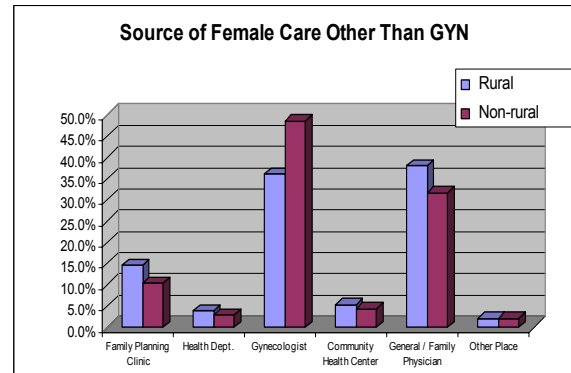
In the domain of overall health status, the BRFSS showed a significant rural:non-rural difference in the proportion of the population that rated their health as either “Fair” or “Poor” (as opposed to “Excellent”, “Very Good”, or “Good”). Respondents in rural areas were 35% more likely than non-rural respondents to state that their health was fair or poor (11.1% compared to 8.2%). This difference may be at least partially related to the higher proportion of elderly residents in rural areas. Rural residents reported a higher average number of poor physical health days (as opposed to mental health), though the difference between rural and non-rural areas was not significant on this measure.



In terms of insurance and health care access, rural residents were 45% more likely to report that they lacked health insurance (13.8% compared to 9.5% for non-rural residents). This difference is statistically significant and consistent with findings from the Health Insurance Survey and observed differences in payor mix for hospital and emergency services between the rural and non-rural areas.

Because these statistics are not adjusted for age or other factors, one must keep in mind that the higher elderly and low-income populations in rural areas result in greater access to the Medicare and Medicaid programs respectively. Both of these programs are counted as forms of insurance in this question, meaning lack of insurance may be an even greater issue for the remainder of the population. Though not statistically significant at 95% confidence, a higher proportion of rural residents surveyed also reported not having a ‘usual source of care’. In alternate years, the BRFSS asks whether the respondents experienced instances where they needed medical care that they could not afford. This question was not asked in 2001, highlighting the need to further examine the impact of lower rates of insurance coverage in rural areas.

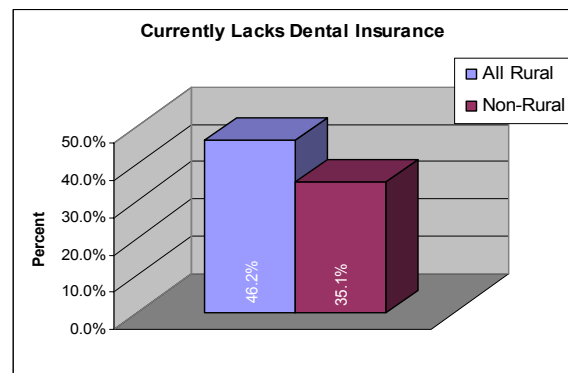
In terms of women's health, women under 45 years old were 24% less likely to see a gynecologist for female health concerns, such as family planning, annual exams, breast exams, and tests for sexually transmitted diseases. In rural areas about 64% of women used a provider other than a gynecologist, compared to approximately 52% in non-rural areas. This is likely due to the relatively lower availability of Ob/Gyn providers in rural areas, and is consistent with the findings related to provider mix derived from analysis of the physician licensure files. Women in rural areas relied more heavily on all other types of providers including family/general practice physicians and providers in family planning clinics, Community Health Centers, and Health Department clinics. Questions on women's preventive health access (mammogram, pap-smear, etc.) are also asked on alternate years and were not part of the 2001 survey, highlighting the need for ongoing investigation in this area as well.



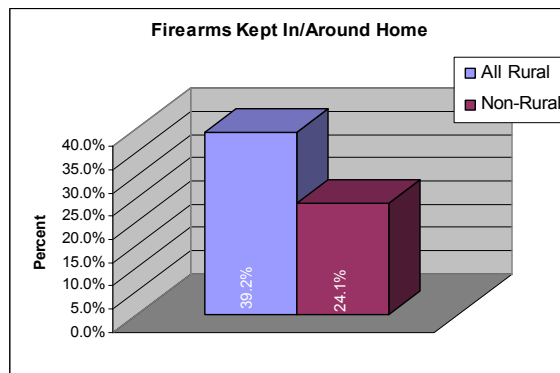
Respondents in rural areas showed a statistically higher proportion reporting limited physical activities due to chronic joint symptoms (such as arthritis) during the past year (10.6% compared to 7.1%). This finding is also likely to be related to the greater proportion of elderly residents in the population. A higher proportion of rural respondents also reported having had joint symptoms '*most days of at least one month*', but this difference was not statistically significant.

Also in the realm of Chronic Disease, the proportion of respondents that reported having diabetes was higher in rural areas. This difference was large, but not statistically significant. Again, the influence of the age profile of the population cannot be discounted.

The issue of dental health access in rural areas is often discussed as a major problem, but statistics on dental access are not routinely available. In 2001, however, the BRFSS asked several questions related to dental access. The survey shows a statistically significant difference in dental insurance rates, with rural residents being 32% more likely than non-rural residents to lack dental insurance coverage (46% compared to 35%). A higher proportion of rural respondents reported that they did not have a dental visit or



dental cleaning within the past year, but this difference was not statistically significant. Nationally in 1997–98, 71 percent of adults ages 18–64 years living in fringe counties of large metro areas reported a dental visit in the past year compared with 57 percent in the most rural counties^{xiv}.



One area where the BRFSS data showed a very sizeable and statistically significant difference is in the presence of firearms in and around the home or vehicle. In rural areas 39% of respondents indicated that they kept firearms, compared to 24% in non-rural areas. This represents a 63% greater likelihood of having a gun present in rural homes. There are likely practical and recreational reasons for this disparity, and the BRFSS did not ask any questions

related to attitudes and practices concerning firearm safety, so it is difficult to draw conclusions about any health impacts from this statistic. The issue of higher death and hospitalization rates due to accidents and injuries (both intentional and accidental) has been discussed earlier in the report, and the presence of firearms may be one of several factors to consider.

It is also worth discussing some of the areas in which the BRFSS did not show significant differences between rural and non-rural areas. In terms of health-related behavior, the survey did not support statistical differences in smoking related factors, including current smoking status and age of initiation. The alcohol-related factors (heavy/binge drinking) also showed no statistically significant differences based on the confidence intervals. These findings contrast with the higher rates of maternal smoking and alcohol consumption during pregnancy in rural areas found in the birth records. These findings may be related to the lack of statistical power in the sample, as both the smoking and heavy alcohol consumption rates were higher in rural areas (though not sufficiently for 95% confidence).

Rural residents also appear highly similar to non-rural residents in the areas of prevention, physical activity, and cardiac risk factors. Nearly equal percentages of rural and non-rural residents reported recent flu/pneumonia shots, prostate screening, and counseling on safe sex (condom use) by a health professional. They were also equally likely to be obese, and to engage in regular physical activity. It should be noted, however, that both rural and non-rural residents fell short of the Healthy People 2010 goals for obesity and physical activity.

D. CONCLUSIONS

The study was designed to identify and quantify disparities in health statistics between rural and non-rural parts of New Hampshire by examining existing data sources. The findings clearly indicate that, in fact, there are health and health-related disparities related to the rural nature of communities in the state, and that those disparities generally favor the health status, access, and outcomes of non-rural residents over those in rural areas.

The findings can be viewed as a series of highly inter-related factors that combine to influence the overall health of the population and the health care delivery system. Sparse population and greater distance to resources define the rural nature of an area. These factors, in turn, influence the social, economic, and demographic profile of the communities, resulting in a rural population that is significantly older, less educated, and poorer than in non-rural areas. Ultimately, these factors influence health care delivery system and health outcomes of rural communities. Elderly residents, for example, require more frequent and intensive health services. Income and employment factors lead to lower insurance rates and increased reliance on public sources of coverage for the non-elderly. These, in turn, present access barriers for the population and place financial pressure on providers who already struggle to maintain locally accessible services with a low population base. As such, the individual findings presented in this report cannot stand alone, and any solutions must recognize the complexity of the challenges facing the rural health care system. While New Hampshire is consistently touted as one of the healthiest states in the nation, this study shows unequal results when the rural factors are differentiated from overall state factors.

In many ways, the differences observed in the health statistics of rural residents might be even greater, if it were not for the numerous rural initiatives already in place to mitigate them. Many of the state's rural hospitals have explored and adopted Critical Access Hospital status, along with other facility and service modifications, that will better enable them to remain viable while many rural hospitals across the country face closing. These hospitals also support primary care delivery systems in their service areas, and there has been significant expansion in the Federally Qualified Health Center (FQHC) community health center network in rural parts of the state, to further promote and improve access. There have also been important and successful efforts to stretch resources by coordination and integration of care through horizontal and vertical network development in these areas.

The findings of the Rural Health Report should guide further monitoring and planning efforts to improve health outcomes, as well as to establish a baseline against which future progress may be measured. As State and local policymakers work to continually improve the health of the population, rural communities are clearly in need of additional attention and resources to equalize the existing gap between the health status of rural and non-rural New Hampshire residents. This fact should be integrated into the policy-making process of the Department of Health and Human Services, as well as other state agencies that can affect health or health-related outcomes.

To improve the health outcomes of rural New Hampshire residents, the DHHS Division of Public Health Services should identify partners at all levels of the public and private sector – healthcare providers, employers, advocacy groups, planners, citizens, health plans, and policy makers, as well as other State programs and agencies, such as; the Office of Energy and Planning, the Department of Education, the Division of Medicaid Business and Policy Coordination, the Division of Public Health Services Maternal and Child Health Section, and others - to participate in further examination of the issues, and the identification of potential solutions. Consideration should be given to effecting policy change that recognizes not only that the health outcomes of rural residents differ from non-rural residents, but also that the delivery of health care in rural areas differs from the delivery in urban and suburban communities. Additionally rural communities and organizations have very limited resources with which to independently sustain the many health and wellness programs that aid rural residents; who themselves have limited resources and a demonstrably greater need of health care and related services. Discussion around state-level policy change might include; assuring that health insurance regulations do not penalize rural health care providers, businesses, and residents, examining reimbursement rates for rural Medicaid providers, improving educational outcomes in rural schools, reviewing the potential for Medicaid reimbursement for telemedicine, and encouraging other state agencies to review their practices and policies to assure that the activities do not have deleterious unintended consequences for New Hampshire rural residents, health care organizations, and businesses.

ⁱ “Health Care State Rankings – 2000”. Morgan Quitno Press. 2000.

ⁱⁱ “Rising Unemployment and the Uninsured”. Kaiser Family Foundation. January 2002.

ⁱⁱⁱ “Trends and Indicators in the Changing Health Care Marketplace – 2002 Chartbook”. Henry J. Kaiser Family Foundation. p 76.

^{iv} EMS 101 Your guide to Central New York's High Performance EMS System, Rural/Metro Medical Services, Chapter 1 : Fast Response

^v National Center for Health Statistics. Health, United States, 2001 With Urban and Rural Health Chartbook. Hyattsville, Maryland: 2001. p68.

^{vi} National Center for Health Statistics. Health, United States, 2001 With Urban and Rural Health Chartbook. Hyattsville, Maryland: 2001. p68.

^{vii} “Coverage Matters – Insurance and Health Care”. Committee on Consequences of Uninsurance, Board on Health Care Services, Institute of Medicine. p 22.

^{viii} Healthy NH 2010. NH Department of Health and Human Services. 2001. p. 6

^{ix} “Coverage Matters – Insurance and Health Care”. Committee on Consequences of Uninsurance, Board on Health Care Services, Institute of Medicine. p.3.

^x National Center for Health Statistics. Health, United States, 2001 With Urban and Rural Health Chartbook. Hyattsville, Maryland: 2001. p 66.

^{xi} National Center for Health Statistics. Health, United States, 2001 With Urban and Rural Health Chartbook. Hyattsville, Maryland: 2001. p 54

^{xii} Healthy NH 2010. NH Department of Health and Human Services. 2001. pp. 18-19

^{xiii} National Center for Health Statistics. Health, United States, 2001 With Urban and Rural Health Chartbook. Hyattsville, Maryland: 2001. p 74

^{xiv} National Center for Health Statistics. Health, United States, 2001 With Urban and Rural Health Chartbook. Hyattsville, Maryland: 2001. p 72

Appendix A: NH RURAL HEALTH REPORT

DATA SOURCES

Appendix A: Data Sources

The Community Health Institute and NH Department of Health and Human Services, Bureau of Rural Health and Primary Care wish to acknowledge the assistance and contribution of other agencies within the state government in the production of this report. These agencies are listed below under the Source for each data set. In particular, we would also like to thank the staff of the Bureau of Health Statistics and Data Management and the Office of Health Planning and Medicaid for contributing analytic support to the project.

<u>Data File:</u>	United States Census
<u>Years:</u>	2000 (1990 trend measures only)
<u>Source:</u>	US Bureau of Census (via NH DHHS Office of Health Planning and Medicaid)
<u>Analytic Method:</u>	Aggregation of town level statistics to rural tiers. Raw Population-Based Percentages and Population Weighted averages calculated. Confidence intervals based on formulas in Ch. 8 of the August revision of the Demographic Profile: 2000 – 2000 Census of Population and Housing, Technical Documentation. Design factors based on 1990 Census of Population and Housing Standard Error Design Factors for New Hampshire, predominately rural counties for rural statistics and predominately urban counties for non-rural statistics
<u>Population Denominators:</u>	Census valid denominators according to each statistic.

<u>Data File:</u>	NH Emergency Medical Service Runs
<u>Years:</u>	1997 – 1999 combined
<u>Source:</u>	NH Department of Safety - Bureau of Emergency Medical Services
<u>Analytic Method:</u>	Runs coded to rural tiers according to town where response directed. Averages and percentages calculated directly. Runs without valid town codes, response codes, and response time intervals dropped. Runs with response time less than 1 minute or greater than 100 minutes dropped (in consultation with Dept. of Safety due to data quality issues).
<u>Population Denominators:</u>	N/A – statistics do not relate to resident population only

Data File: Physician Licensure File
Years: 1998, 2001
Source: NH Board of Medicine
Analytic Method: Providers coded to rural tiers according to licensed address and matched across years using license number.
Population Denominators: 2000 Census population (for 10-mile ratio only)

Data File: New Hampshire Health Insurance Coverage and Access Survey
Years: 1999
Source: NH DHHS Office of Health Planning and Medicaid
Analytic Method: Responses coded to rural tiers according to town of residence of respondent. Weighted percentage statistics for rural tiers provided directly by OHPM.
Population Denominators: Census 1997 estimate of non-elderly individuals

Data File: NH Resident Birth Records
Years: 1998 – 2000 Combined
Source: NH Dept. of Health and Human Services, Bureau of Health Statistics and Data Management
Analytic Method: Births coded to rural tiers according to town of residence of mother. Rural tier statistics and confidence intervals provided directly by Bureau of Health Statistics
Population Denominators: N/A – all statistics based on total birth records in rural tier for which statistic was available.

Data File: NH Resident Death Records
Years: 1999-2000 combined
Source: NH Dept. of Health and Human Services, Bureau of Health Statistics and Data Management
Analytic Method: Deaths coded to rural tiers according to town of residence of decedent. Crude and age-adjusted rural tier statistics and confidence intervals provided directly by Bureau of Health Statistics. Age adjusting based on Census 2000 std. population. Cause of death according to standard ICD-10 codes.
Population Denominators: Summary of 1990, 2000, interpolated town level US Census estimates

Data File: NH Inpatient Hospital Discharge Records
Years: 1998 – 2000 combined
Source: NH Dept. of Health and Human Services, Bureau of Health Statistics and Data Management
Analytic Method: Discharges coded to rural tiers according to town of residence of patient. Crude and age-adjusted rural tier statistics and confidence intervals provided directly by Bureau of Health Statistics. Age adjusting based on Census 2000 std. population. Diagnosis according to standard ICD-9 codes.
NOTE: statistics with Out of State facility hospitalizations included based on 1999 data from surrounding states combined with 1998-2000 in-state records.
Population Denominators: Summary of 1990, 2000, interpolated town level US Census estimates

Data File: NH Emergency Department and Observation-Stay Discharge Records
Years: 2000
Source: NH Dept. of Health and Human Services, Bureau of Health Statistics and Data Management
Analytic Method: Discharges coded to rural tiers according to town of residence of patient. Crude and age-adjusted rural tier statistics and confidence intervals provided directly by Bureau of Health Statistics. Age adjusting based on Census 2000 std. population. Diagnosis according to standard ICD-9 codes.
Population Denominators: Summary of 1990, 2000, interpolated town level US Census estimates

Data File: NH Primary Care Access Data Set
Years: 1993 - 1997
Source: NH Dept. of Health and Human Services, Bureau of Health Statistics and Data Management
Analytic Method: Equivalents of birth, death, and hospitalization data listed above. Age stratified statistics provided directly by Bureau of Health Statistics. Not all statistics available for all age strata. Age adjusted statistics calculated when all age ranges available.
Population Denominators: Summary of 1990, 2000, interpolated town level US Census estimates

<u>Data File:</u>	Behavioral Risk Factor Surveillance System (BRFSS) Survey
<u>Years:</u>	2001
<u>Source:</u>	Survey data, National Center for Chronic Disease Prevention and Health Promotion, CDC/DHHS. NH Statistics provided by NH Dept. of Health and Human Services, Bureau of Health Statistics and Data Management
<u>Analytic Method:</u>	Responses coded to rural tiers according to town of residence of respondent. Weighted percentage statistics and confidence intervals for rural tiers provided directly by Bureau of Health Statistics
<u>Population Denominators:</u>	2000 US Census

Appendix B: NH RURAL HEALTH REPORT

TABLES OF STATISTICAL FINDINGS

Appendix B: Tables of Statistical Findings

The following pages present the statistical measures developed for the study, corresponding to the rural tiers described in the report. Although the data is derived from a wide variety of different sources, including secondary data sets and survey research, the format is intended to present the data as simply and consistently as possible. The tables present the calculated ‘statistic’ of interest for each tier and for the state overall, along with several columns designed to highlight any differences that exist between the consolidated ‘rural’ tiers and the non-rural tier. The general layout of the columns is shown below, accompanied by an explanation of each. Note that the columns for the BRFSS survey are slightly different as the survey could only be analyzed at the 2-tier rural level.

Data Source	Statistic	Units	Rural Low Density	Rural Medium Density	Rural High Density		All Rural	Non-Rural	State	95% conf. Rural is Statistically:	All Rural : Non-Rural Difference	All Rural : Non-Rural Ratio
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Data Source:

The data set or survey from which the statistics were derived. Please refer to Appendix A for a description of each data set and details on how it was analyzed.

Statistic:

A brief description of the specific item from the data source presented on that line.

Units:

A brief description of the units and basis in which the statistic is expressed for each of the geographic units.

Rural - Low Density:

The statistic for areas of the state with 10-mile radius population densities of under 50 persons per square mile (also referred to as the ‘most rural’ tier in the body of the report).

Rural - Medium Density:

The statistic for areas of the state with 10-mile radius population densities from 50 to 100 persons per square mile.

Rural - High Density:

The statistic for areas of the state with 10-mile radius population densities from 100 to 200 persons per square mile.

All Rural:

The statistic for the consolidated rural definition, which combines the low, medium, and high density rural tiers (or all areas of the state with 10-mile radius population densities under 200 persons per square mile. This is the rural statistic that is used for the primary comparison to non-rural areas, and the one primarily discussed in the body of the report.

Non-Rural:

The statistic for the area of the state not included in the consolidated 'rural' tiers. These are areas with a 10-mile radius population density of 200 persons per square mile or greater. This is the statistic against which the rural statistics are measured.

State:

The statistic for all areas of the state combined. This statistic shows how the statewide statistics are influenced by the often-different rural and non-rural components of the state's population.

'95% Confidence Rural is Statistically':

A summary of whether the "All Rural" and "Non-Rural" mean numbers are statistically different at the 95% confidence level, and in what direction. This single measure is presented rather than presenting the upper and lower limits of the confidence intervals, or the p-value of cross-tabulated information. There are three possible findings for this measure:

SAME : Any observed difference between the All Rural and Non-Rural tiers cannot be supported with 95% confidence. This does not mean that there is no difference between the tiers, but rather that the level of uncertainty due to the power of the numbers is greater than the observed difference.

HIGHER: The statistic for the All Rural tier is a larger number than the statistic for the Non-Rural tier and the difference exceeds the level of uncertainty in the numbers at the 95% confidence level.

LOWER: The statistic for the All Rural tier is a smaller number than the statistic for the Non-Rural tier and the difference exceeds the level of uncertainty in the numbers at the 95% confidence level.

All Rural : Non-Rural Difference:

The numerical difference between the mean value for the All Rural and Non-Rural statistics, presented in the same units as the statistics themselves. If the observed rural statistic is higher, the number will be positive; if lower it will be negative. Note that this difference is calculated even though the difference may not be supported with 95% confidence. Also, the mean value is the most likely value for each tier, but one can only be 95% confident that the true value is in a range around that mean. As such, there is some uncertainty to the difference reported.

All Rural : Non-Rural Ratio:

The ratio between the mean values for the All Rural and Non-Rural tiers. The number is calculated as (All Rural mean / Non-Rural mean) and shows the relative magnitude of the difference between the statistics. If the rural statistic is higher, greater than 1.00; if lower it will be less than 1.00. Note that this ratio is calculated even though the difference may not be supported with 95% confidence and the caveats regarding the 95% confidence intervals around the means also apply.

Appendix B: Tables of Statistical Findings

Data Source	Statistic	Units	Rural Low Density	Rural Medium Density	Rural High Density	All Rural	Non-Rural	State	95% conf. Rural is Statistically:	All Rural : Non-Rural Difference	All Rural : Non-Rural Ratio
Census 2000 - Population / Density	Population	Resident Persons	71,881	146,160	242,204	460,245	775,305	1,235,550			
	% Population	% of State Population	5.8%	11.8%	19.6%	37.3%	62.7%	100.0%			
	Land Area	Square Miles	3,860	2,034	1,822	7,716	1,437	9,153			
	% Land Area	% of State Land Area	42.2%	22.2%	19.9%	84.3%	15.7%	100.0%			
	Average Population Density	Persons / Square Mile	19	72	133	60	539	135			
Census 2000 - Demographics	% Female	% of population	50.3%	50.8%	51.1%	50.9%	50.8%	50.8%	SAME	0.1%	1.00
	% Age <20 years	% of population	25.5%	26.7%	27.8%	27.1%	28.3%	27.9%	LOWER	-1.2%	0.96
	% Age 20-65 years	% of population	59.1%	57.7%	59.3%	58.8%	61.0%	60.2%	LOWER	-2.3%	0.96
	% age 65+years	% of population	15.3%	15.6%	12.9%	14.1%	10.7%	12.0%	HIGHER	3.4%	1.32
	% Rac/Eth Minority	% of population	2.6%	2.6%	3.3%	3.0%	6.0%	4.9%	LOWER	-3.1%	0.49
	% Non-Family Households	% of Households	33.5%	31.5%	31.6%	31.9%	31.8%	31.8%	SAME	0.1%	1.00
	% Households w/ resident <18 yrs	% of Households	31.0%	32.4%	34.9%	33.4%	36.7%	35.5%	LOWER	-3.3%	0.91
	% Households w/ resident 65+ yrs	% of Households	26.1%	26.8%	22.7%	24.6%	19.6%	21.5%	HIGHER	5.0%	1.26
	Avg. Household size	Persons	2.38	2.44	2.51	2.47	2.57	2.53	**	-0.10	0.96
	Avg. Family size	Persons	2.86	2.91	2.98	2.94	3.08	3.03	**	-0.14	0.95
	Housing Vacancy Rate	% of Households	40.4%	29.2%	13.4%	24.5%	4.4%	13.2%	HIGHER	20.1%	5.59
	Seasonal/Recreat. Housing Rate	% of Households	35.2%	25.2%	10.3%	20.6%	2.2%	10.3%	HIGHER	18.4%	9.30
	% Edu < HS	% of pop. Education known	16.5%	13.0%	13.9%	14.0%	11.7%	12.6%	HIGHER	2.3%	1.20
	% Edu HS+	% of pop. Education known	61.6%	60.0%	60.4%	60.4%	57.7%	58.8%	HIGHER	2.7%	1.05
	% Edu Bach +	% of pop. Education known	21.9%	27.0%	25.7%	25.5%	30.5%	28.7%	LOWER	-5.0%	0.84
	% Grandparent Caregiver	% HH w/ Grandparent/child	38.8%	33.3%	34.2%	34.5%	29.1%	30.9%	HIGHER	5.5%	1.19
	% Disabled Age 5-20 yrs	% of population by age	9.4%	8.5%	8.3%	8.5%	8.3%	8.4%	SAME	0.2%	1.03
	% Disabled Age 21-64 yrs	% of population by age	20.8%	17.0%	16.7%	17.4%	15.3%	16.1%	HIGHER	2.1%	1.13
	% Disabled Age 65+ yrs	% of population by age	41.3%	36.2%	39.0%	38.4%	38.7%	38.6%	SAME	-0.3%	0.99
	% Disabled Overall	% of population	21.4%	18.0%	17.4%	18.2%	16.1%	16.9%	HIGHER	2.1%	1.13
	% Moved w/in 5 years	% of pop. age 5+ w/ valid prior residence	38.1%	41.1%	42.1%	41.2%	45.4%	43.8%	LOWER	-4.3%	0.91
	% Not Fluent English	% of pop. age 5+ able to speak	1.1%	1.6%	1.5%	1.5%	3.0%	2.4%	LOWER	-1.5%	0.49

* Suppressed due to low numbers

** Not Calculated - design factor information not available

Appendix B: Tables of Statistical Findings

Data Source	Statistic	Units	Rural Low Density	Rural Medium Density	Rural High Density	All Rural	Non-Rural	State	95% conf. Rural is Statistically:	All Rural : Non-Rural Difference	All Rural : Non-Rural Ratio
Census 2000 - Employment	% Unemployed	% of pop. In Labor Force	4.3%	4.6%	4.5%	4.5%	3.3%	3.8%	HIGHER	1.2%	1.35
	% Age 16+ Not in Labor Force	% of pop. Age 16+	32.8%	33.9%	30.9%	32.2%	27.9%	29.5%	HIGHER	4.3%	1.16
	Mean Commute Minutes	Minutes per trip (one way)	23.2	26.5	23.9	24.6	25.6	25.3	SAME	-1.0	0.96
	% Self Employed / family workers	% of Employed pop. Age 16+	11.0%	11.6%	8.6%	9.9%	6.7%	7.8%	HIGHER	3.2%	1.48
	% Occ Mgt/Prof	% of Employed pop. Age 16+	27.8%	32.9%	33.2%	32.3%	37.8%	35.8%	LOWER	-5.5%	0.85
	% Occ. Service	% of Employed pop. Age 16+	16.9%	15.4%	13.5%	14.6%	12.1%	13.0%	HIGHER	2.6%	1.21
	% Occ Sales/Office	% of Employed pop. Age 16+	23.5%	24.5%	25.5%	24.9%	27.6%	26.6%	LOWER	-2.7%	0.90
	% Occ. Farm/Fish/Forestry	% of Employed pop. Age 16+	1.9%	0.8%	0.5%	0.8%	0.3%	0.4%	HIGHER	0.5%	3.13
	% Occ. Const/Maint.	% of Employed pop. Age 16+	12.1%	11.6%	10.3%	11.0%	8.4%	9.4%	HIGHER	2.6%	1.31
	% Occ. Production/Transportation	% of Employed pop. Age 16+	17.7%	14.9%	16.9%	16.4%	13.9%	14.8%	HIGHER	2.6%	1.18
Census 2000 - Income & Poverty	% HH w/ Soc Sec	% of Households w/ Earnings	38.9%	38.3%	31.4%	34.8%	26.4%	29.5%	HIGHER	8.4%	1.32
	% HH w/ SSI	% of Households w/ Earnings	4.0%	4.1%	4.0%	4.0%	3.3%	3.6%	HIGHER	0.7%	1.23
	% HH w/ Pub Asst.	% of Households w/ Earnings	4.6%	4.1%	4.0%	4.2%	3.2%	3.6%	HIGHER	0.9%	1.29
	% HH w/ Retirement Income	% of Households w/ Earnings	22.2%	24.0%	20.3%	21.8%	18.3%	19.6%	HIGHER	3.4%	1.19
	Mean Family Income	\$ per family per year	\$ 45,150	\$ 50,658	\$ 53,821	\$ 51,397	\$ 64,173	\$ 59,338	LOWER	\$ (12,776)	0.80
	Mean Per Capita Income	\$ per person per year	\$ 19,110	\$ 22,258	\$ 22,154	\$ 21,711	\$ 25,111	\$ 23,845	LOWER	\$ (3,400)	0.86
	% Poverty Families	% of families w/ poverty level determined	5.7%	5.3%	4.0%	4.7%	4.0%	4.3%	HIGHER	0.6%	1.16
	% Poverty Families w/ child <5y	% of families w/ child <5 w/ poverty level	12.6%	11.9%	9.9%	10.9%	7.9%	8.9%	HIGHER	3.0%	1.37
	% Poverty Individuals	% of persons w/ poverty level determined	8.5%	8.0%	6.8%	7.4%	6.0%	6.5%	HIGHER	1.4%	1.23
	% Poverty Ind. Rel children < 18y	% of persons w/ child <18 w/ poverty level	9.6%	9.7%	7.0%	8.2%	6.8%	7.3%	HIGHER	1.4%	1.21
Census 2000 - Housing	% Last Moved 5 Years	% of Occupied Housing Units	41.1%	42.8%	44.5%	43.4%	49.6%	47.3%	LOWER	-6.2%	0.87
	% Last Moved 6-10 Years	% of Occupied Housing Units	15.5%	15.4%	15.9%	15.7%	15.6%	15.6%	SAME	0.0%	1.00
	% Last Moved 11-20 Years	% of Occupied Housing Units	21.6%	21.9%	20.6%	21.2%	17.7%	19.0%	HIGHER	3.5%	1.20
	% Last Moved 20+ Years	% of Occupied Housing Units	21.8%	19.8%	19.1%	19.8%	17.1%	18.1%	HIGHER	2.7%	1.16
	% No Vehicle Available	% of Occupied Housing Units	4.9%	5.0%	6.0%	5.5%	5.9%	5.8%	SAME	-0.4%	0.93
	% Lacking Complete Plumbing Facilities	% of Occupied Housing Units	1.1%	0.8%	0.5%	0.7%	0.4%	0.5%	SAME	0.3%	1.82
	% Lacking Complete Kitchen Facilities	% of Occupied Housing Units	0.8%	0.6%	0.4%	0.5%	0.4%	0.4%	SAME	0.2%	1.46
	% No Telephone Service	% of Occupied Housing Units	1.7%	1.4%	1.4%	1.5%	0.9%	1.1%	HIGHER	0.6%	1.64
	% Owner Cost > 30% of Income	% Owner Occupied Units	21.4%	22.9%	22.3%	22.3%	22.4%	22.4%	SAME	0.0%	1.00
	% Renter Cost > 30% of Income	% Renter Occupied Units	30.7%	36.8%	35.8%	35.3%	34.7%	34.9%	SAME	0.6%	1.02
	% Overall Housing Cost > 30% of Income	% Housing Units	24.2%	26.8%	26.8%	26.4%	26.9%	26.8%	SAME	-0.5%	0.98

* Suppressed due to low numbers

** Not Calculated - design factor information not available

Appendix B: Tables of Statistical Findings

Data Source	Statistic	Units	Rural Low Density	Rural Medium Density	Rural High Density	All Rural	Non-Rural	State	95% conf. Rural is Statistically:	All Rural : Non-Rural Difference	All Rural : Non-Rural Ratio
Census 1990-2000 Basic Trends	90-00 % Pop Change	% of 1990 Population	7.4%	12.9%	8.0%	9.5%	12.6%	11.4%	**	-3.1%	0.75
	90-00 % Change Pop <20y	% of 1990 Population by age	-0.6%	7.6%	3.9%	4.3%	13.2%	9.8%	**	-8.9%	0.33
	90-00 % Change Pop 20-65y	% of 1990 Population by age	9.3%	12.8%	9.0%	10.2%	11.2%	10.8%	**	-1.0%	0.91
	90-00 % Change Pop 65+y	% of 1990 Population by age	15.6%	24.2%	13.2%	17.2%	19.1%	18.3%	**	-1.9%	0.90
	1990 Per Capita Income	\$ per person per year	\$ 12,678	\$ 14,549	\$ 14,824	\$ 14,398	\$ 17,414	\$ 16,270	**	\$ (3,016)	0.83
	90-00 Income Trend	% of 1990 Per Capita Income	50.7%	53.0%	49.4%	50.8%	44.2%	46.6%	**	6.6%	1.15
	% 1990 Edu <HS	% of pop. Education known	22.4%	18.8%	20.1%	20.0%	16.5%	17.8%	**	3.6%	1.22
	% 1990 Edu HS+	% of pop. Education known	59.7%	57.9%	57.5%	58.0%	57.7%	57.8%	**	0.3%	1.01
	% 1990 Edu Bach +	% of pop. Education known	17.9%	23.3%	22.5%	22.0%	25.8%	24.4%	**	-3.9%	0.85
Emergency Medical Service Runs 1997-1999	Response Time : Dispatch - TimeOut	Avg. Minutes per Emerg.Run	4.18	3.53	2.82	3.29	1.73	2.60	HIGHER	1.56	1.90
	Response Time: TimeOut - OnScene	Avg. Minutes per Emerg.Run	7.68	6.27	5.22	5.99	4.98	5.54	HIGHER	1.01	1.20
	Response Time: Overall	Avg. Minutes per Emerg.Run	11.86	9.80	8.04	9.28	6.71	8.14	HIGHER	2.57	1.38
	Fractile Response: % Over 8 Minutes	% of Emergency Runs	60.5%	47.9%	35.1%	43.7%	24.1%	35.0%	HIGHER	0.20	1.81
	Non-Emergent Portion of Runs	% of Total Runs	10.4%	10.8%	5.6%	8.2%	3.9%	6.2%	HIGHER	0.04	2.10
	Mutual-Aid Portion of Emergent Runs	% of Emergency Runs	0.7%	0.8%	0.4%	0.6%	0.4%	0.5%	HIGHER		
Primary Care Providers 1998 & 2001	% Change in Primary Care Providers	% 98-00 Provider growth	15.2%	12.4%	18.3%	16.4%	13.2%	14.5%	SAME	3.1%	1.24
	% 1998 PCPs that left practice in NH	% of 1998 providers	4.5%	10.6%	14.0%	11.8%	8.2%	9.6%	SAME	3.6%	1.44
	% 2001 PCPs that are new to NH	% of 2001 providers	18.4%	22.0%	27.9%	25.1%	18.3%	21.1%	HIGHER	6.8%	1.37
	% 1998 PCPs that moved	% of 1998 providers	13.6%	11.5%	5.0%	7.9%	9.8%	9.0%	SAME	-1.9%	0.81
	% 1998 PCPs in same town in 2001	% of 1998 providers	81.8%	77.9%	81.0%	80.3%	82.1%	81.4%	SAME	-1.8%	0.98
	% 2001 PCPs in same town as in 1998	% of 2001 providers	71.1%	69.3%	68.5%	69.0%	72.5%	71.1%	SAME	-3.5%	0.95
	Migration between rural and urban areas	% of all providers that moved within NH				30.6%	9.0%		SAME	21.6%	3.40
	% FP 2001	% of Primary Care providers	53.9%	38.6%	28.5%	34.5%	31.0%	32.4%	SAME	3.5%	1.11
	% GP 2001	% of Primary Care providers	1.3%	4.7%	1.8%	2.4%	3.0%	2.7%	SAME	-0.6%	0.80
	% IM 2001	% of Primary Care providers	30.3%	32.3%	40.9%	37.3%	33.0%	34.8%	SAME	4.3%	1.13
	% OBG 2001	% of Primary Care providers	3.9%	9.4%	11.2%	9.8%	14.8%	12.7%	SAME	-5.0%	0.66
	% PD 2001	% of Primary Care providers	10.5%	15.0%	17.6%	15.9%	18.3%	17.3%	SAME	-2.4%	0.87

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** Not Calculated - design factor information not available

Appendix B: Tables of Statistical Findings

Data Source	Statistic	Units	Rural Low Density	Rural Medium Density	Rural High Density	All Rural	Non-Rural	State	95% conf. Rural is Statistically:	All Rural : Non-Rural Difference	All Rural : Non-Rural Ratio
Health Insurance Coverage and Access Survey 1999	% Uninsured	% of Population < 65 years	13.4%	12.2%	10.8%	11.7%	7.9%	9.3%	HIGHER	3.8%	1.48
	% Publicly Insured	% of Population < 65 years				8.3%	6.4%	7.1%	HIGHER	1.9%	1.30
	% Private/Other Insurance	% of Population < 65 years				80.0%	85.8%	83.6%	LOWER	-5.8%	0.93
	% of Uninsured that are Working	% of Uninsured < 65 years				59.7%	54.5%	56.9%	HIGHER	5.1%	1.09
	% of Working Uninsured not offered coverage by employers	% of Working Uninsured				67.1%	56.9%	61.8%	HIGHER	10.2%	1.18
Resident Births Records 1998 - 2000	Maternal Tobacco Use	% of Births	22.7%	19.1%	20.0%	20.1%	14.9%	16.6%	HIGHER	5.2%	1.35
	Maternal Alcohol Use	% of Births	1.7%	1.5%	1.6%	1.6%	1.1%	1.3%	HIGHER	0.5%	1.42
	Maternal age < 20	% of Births	9.5%	9.2%	9.1%	9.2%	6.2%	7.2%	HIGHER	3.0%	1.48
	Mother Unmarried	% of Births	32.1%	27.8%	29.0%	29.1%	22.0%	24.3%	HIGHER	7.1%	1.32
	Low Maternal Education	% of Births	13.1%	12.7%	12.9%	12.8%	9.2%	10.4%	HIGHER	3.7%	1.40
	Medicaid Paid Birth	% of Births	33.2%	27.1%	25.8%	27.3%	17.2%	20.9%	HIGHER	10.0%	1.58
	Early Prenatal Care	% of Births	89.3%	90.7%	89.7%	90.0%	90.4%	90.2%	SAME	-0.4%	1.00
	Late Prenatal Care	% of Births	1.1%	1.2%	1.4%	1.3%	1.6%	1.5%	LOWER	-0.4%	0.78
	Low Birth Weight	% of Births	5.6%	6.0%	6.1%	6.0%	6.1%	6.1%	SAME	-0.1%	0.98
	Low Gest Age	% of Births	6.9%	8.3%	7.7%	7.8%	7.7%	7.7%	SAME	0.0%	1.00
	Infant Mortality Rate	Rate / 1,000 live births	*	10.0	3.8	6.0	5.0	5.3	SAME	1.1	1.22

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Data Source	Statistic	Units	Rural Low Density	Rural Medium Density	Rural High Density	All Rural	Non-Rural	State	95% conf. Rural is Statistically:	All Rural : Non-Rural Difference	All Rural : Non-Rural Ratio
Resident Death Records Leading Causes 1999 - 2000											
	All Deaths	Age-Adjusted Rate per 100,000	853.5	803.2	748.1	803.4	811.5	817.1	SAME	-8.1	0.99
	All Deaths	Crude Rate per 100,000	984.7	929.3	782.7	879.6	709.9	782.2	HIGHER	169.7	1.24
	Accidents	Age-Adjusted Rate per 100,000	39.3	37.6	24.1	31.5	23.3	26.7	HIGHER	8.2	1.35
	Accidents	Crude Rate per 100,000	41.8	39.2	24.6	32.4	22.0	26.2	HIGHER	10.4	1.47
	Alzheimer's disease	Age-Adjusted Rate per 100,000	22.6	21.9	21.4	22.3	23.8	23.5	SAME	-1.5	0.94
	Alzheimer's disease	Crude Rate per 100,000	25.1	25.5	22.9	24.6	20.0	22.0	SAME	4.6	1.23
	Assault (homicide)	Age-Adjusted Rate per 100,000	*	*	*	*	1.7	1.5	N/A	0	-
	Assault (homicide)	Crude Rate per 100,000	*	*	*	*	1.8	1.5	N/A	0	-
	Atherosclerosis	Age-Adjusted Rate per 100,000	*	*	4.1	4.6	7.4	6.2	SAME	-2.8	0.62
	Atherosclerosis	Crude Rate per 100,000	*	*	4.3	5.1	6.2	5.9	SAME	-1.1	0.82
	Cerebrovascular Diseases	Age-Adjusted Rate per 100,000	52.0	56.6	55.2	56.8	56.5	57.4	SAME	0.3	1.01
	Cerebrovascular Diseases	Crude Rate per 100,000	59.2	66.1	58.6	62.5	48.3	54.2	HIGHER	14.2	1.29
	Chronic liver disease and cirrhosis	Age-Adjusted Rate per 100,000	*	*	*	2.8	3.2	3.1	SAME	-0.4	0.88
	Chronic liver disease and cirrhosis	Crude Rate per 100,000	*	*	*	3.1	2.9	3.0	SAME	0.2	1.07
	Chronic lower respiratory diseases	Age-Adjusted Rate per 100,000	50.4	51.2	40.5	46.8	51.9	50.3	SAME	-5.1	0.90
	Chronic lower respiratory diseases	Crude Rate per 100,000	59.9	60.6	42.2	51.7	44.4	47.7	SAME	7.3	1.16
	Diabetes mellitus	Age-Adjusted Rate per 100,000	23.8	22.7	21.6	22.9	26.7	25.3	SAME	-3.8	0.86
	Diabetes mellitus	Crude Rate per 100,000	27.9	26.8	22.5	25.3	23.1	24.2	SAME	2.2	1.10

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** Not Calculated - design factor information not available

Appendix B: Tables of Statistical Findings

Data Source	Statistic	Units	Rural Low Density	Rural Medium Density	Rural High Density	All Rural	Non-Rural	State	95% conf. Rural is Statistically:	All Rural : Non-Rural Difference	All Rural : Non-Rural Ratio
Resident Death Records Leading Causes 1999 - 2000 (cont)											
	Diseases of heart	Age-Adjusted Rate per 100,000	260.6	207.4	231.1	235.0	234.8	237.6	SAME	0.2	1.00
	Diseases of heart	Crude Rate per 100,000	303.6	243.6	243.4	259.1	202.5	226.3	HIGHER	56.6	1.28
	Essential Hypertension & hyp	Age-Adjusted Rate per 100,000	*	*	5.5	5.5	5.3	5.5	SAME	0.2	1.04
	Essential Hypertension & hyp	Crude Rate per 100,000	*	*	5.8	6.1	4.5	5.2	SAME	1.6	1.36
	Human immunodeficiency vir	Age-Adjusted Rate per 100,000	*	*	*	*	1.3	1.1	N/A	0	-
	Human immunodeficiency vir	Crude Rate per 100,000	*	*	*	*	1.4	1.2	N/A	0	-
	Influenza and pneumonia	Age-Adjusted Rate per 100,000	24.9	18.1	15.2	18.1	14.4	16.2	SAME	3.7	1.26
	Influenza and pneumonia	Crude Rate per 100,000	27.9	21.0	16.1	19.9	12.2	15.3	HIGHER	7.7	1.63
	Intentional self-harm (suicide	Age-Adjusted Rate per 100,000	16.1	12.2	9.4	11.4	10.3	10.9	SAME	1.1	1.11
	Intentional self-harm (suicide	Crude Rate per 100,000	16.7	12.4	9.6	11.8	10.4	11.0	SAME	1.4	1.13
	Malignant neoplasms	Age-Adjusted Rate per 100,000	210.6	213.5	188.7	205.3	201.8	205.6	SAME	3.5	1.02
	Malignant neoplasms	Crude Rate per 100,000	250.0	251.5	195.9	226.6	178.9	199.0	HIGHER	47.7	1.27
	Nephritis, nephrotic syndrom	Age-Adjusted Rate per 100,000	*	9.0	6.8	7.2	9.3	8.5	SAME	-2.1	0.77
	Nephritis, nephrotic syndrom	Crude Rate per 100,000	*	10.3	7.1	8.0	8.0	8.1	SAME	0	1.00
	Septicemia	Age-Adjusted Rate per 100,000	*	*	*	3.2	6.7	5.2	LOWER	-3.5	0.48
	Septicemia	Crude Rate per 100,000	*	*	*	3.5	5.8	5.0	SAME	-2.3	0.60

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Hospital Discharges 1998 - 2000	All Hospitalization + OOS	Age-Adjusted Rate per 100,000	10,118.8	10,439.8	10,095.6	10,198.1	9,868.2	9,942.5	HIGHER	329.9	1.03
	Psychiatric Hosp. + OOS	Crude Rate per 100,000	437.0	533.9	533.5	518.5	351.1	413.6	HIGHER	167.4	1.48
	Drug/Alcohol Hosp + OOS	Crude Rate per 100,000	83.9	111.4	103.3	102.9	131.2	120.6	LOWER	-28.3	0.78
	All Hospitalizations - NH	Age-Adjusted Rate per 100,000	9,310.3	9,443.9	9,143.4	9,254.1	8,027.0	8,491.1	HIGHER	1,227.1	1.15
	ACS Condition	Age-Adjusted Rate per 100,000	1,276.3	1,210.3	1,197.4	1,213.3	1,029.2	1,104.0	HIGHER	184.1	1.18
	Marker Condition	Age-Adjusted Rate per 100,000	390.6	373.9	387.2	383.2	336.6	355.2	HIGHER	46.6	1.14
	Heart	Age-Adjusted Rate per 100,000	1,162.9	1,086.9	1,098.0	1,104.5	1,015.1	1,050.9	HIGHER	89.4	1.09
	Deliveries	Age-Adjusted Rate per 100,000	1,046.1	1,096.1	1,005.5	1,036.0	1,012.7	1,022.4	SAME	23.3	1.02
	Injury Principal Diagnosis	Age-Adjusted Rate per 100,000	747.9	688.0	654.3	679.1	543.8	594.7	HIGHER	135.3	1.25
	Unintentional Injury	Age-Adjusted Rate per 100,000	478.2	432.5	386.4	415.2	330.9	362.3	HIGHER	84.3	1.25
	Self-Harm	Age-Adjusted Rate per 100,000	41.5	59.5	55.9	54.7	45.8	49.0	HIGHER	8.9	1.19
	Assault	Age-Adjusted Rate per 100,000	*	6.2	5.9	6.3	4.9	5.3	SAME	1.4	1.29
	Psychiatric	Age-Adjusted Rate per 100,000	394.8	489.0	470.3	463.7	300.7	359.5	HIGHER	163.0	1.54
	Alcohol/Drug Abuse, Dep.	Age-Adjusted Rate per 100,000	72.1	93.8	90.7	89.0	108.7	101.5	LOWER	(19.7)	0.82
	Payor Mix - All Discharges	Medicaid % of total disch.	11%	10%	10%	10%	8%	9%	HIGHER	2%	1.20
		Medicare % of total disch.	45%	43%	41%	42%	36%	39%	HIGHER	7%	1.18
		Other % of total disch.	1%	1%	1%	1%	1%	1%	LOWER	0%	0.76
		Private Ins. % of total disch.	36%	40%	44%	41%	50%	46%	LOWER	-8%	0.83
		Self pay % of total disch.	6%	5%	4%	5%	5%	5%	SAME	0%	1.03
		Workers Comp % of total disch.	1%	1%	1%	1%	1%	1%	HIGHER	0%	1.19
	Payor Mix - Discharges Age < 65	Medicaid % of total disch.	19%	17%	16%	17%	13%	14%	HIGHER	4%	132%
		Medicare % of total disch.	9%	8%	8%	8%	7%	7%	HIGHER	1%	118%
		Other % of total disch.	1%	1%	1%	1%	1%	1%	SAME	0%	88%
		Private Ins. % of total disch.	60%	65%	67%	65%	72%	69%	LOWER	-6%	91%
		Self pay % of total disch.	10%	8%	7%	8%	7%	7%	HIGHER	1%	114%
		Workers Comp % of total disch.	2%	1%	1%	1%	1%	1%	HIGHER	0%	128%

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Appendix B: Tables of Statistical Findings

Data Source	Statistic	Units	Rural Low Density	Rural Medium Density	Rural High Density	All Rural	Non-Rural	State	95% conf. Rural is Statistically:	All Rural : Non-Rural Difference	All Rural : Non-Rural Ratio
Emergency Department Discharges 2000	All ED Visits	Age-Adjusted Rate per 100,000	12,255.1	14,443.0	11,837.8	12,708.3	11,358.2	11,851.2	HIGHER	1,350.1	1.12
	ACS Conditions	Age-Adjusted Rate per 100,000	2,048.3	2,451.0	2,142.0	2,222.1	1,799.4	1,952.2	HIGHER	422.7	1.23
	ACS Proportion of total	% of total ER discharges	16.7%	17.0%	18.1%	17.5%	15.8%	16.5%	**	1.6%	1.10
	Payor Mix - All Discharges	Medicaid % of total disch.	13.8%	13.5%	13.2%	13.4%	11.4%	12.2%	HIGHER	2.1%	1.18
		Medicare % of total disch.	20.1%	17.2%	16.4%	17.2%	14.0%	15.3%	HIGHER	3.2%	1.23
		Other % of total disch.	0.7%	0.9%	0.7%	0.8%	1.1%	0.9%	LOWER	-0.3%	0.72
		Private Ins. % of total disch.	41.8%	45.0%	45.1%	44.6%	49.2%	47.3%	LOWER	-4.6%	0.91
		Self pay % of total disch.	15.6%	16.2%	17.2%	16.6%	17.3%	17.0%	LOWER	-0.7%	0.96
		Workers Comp % of total disch.	8.0%	7.3%	7.3%	7.4%	7.1%	7.2%	HIGHER	0.3%	1.04
	Payor Mix - Discharges Age < 65	Medicaid % of total disch.	16.7%	15.9%	15.2%	15.6%	12.6%	13.8%	HIGHER	3.1%	1.24
		Medicare % of total disch.	4.4%	3.5%	4.7%	4.2%	5.0%	4.7%	LOWER	-0.8%	0.84
		Other % of total disch.	0.9%	1.0%	0.7%	0.9%	1.1%	1.0%	LOWER	-0.3%	0.77
		Private Ins. % of total disch.	49.8%	52.2%	51.4%	51.4%	54.3%	53.2%	LOWER	-2.9%	0.95
		Self pay % of total disch.	18.7%	19.0%	19.7%	19.3%	19.1%	19.2%	SAME	0.2%	1.01
		Workers Comp % of total disch.	9.5%	8.4%	8.3%	8.5%	7.9%	8.1%	HIGHER	0.7%	1.09

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PCAD 1993-1997 Socioeconomic Risk Indicators	A. % Deaths <12 Yrs. Education										
	People (Age 25-44)	% of deaths by age	15.7%	13.7%	20.5%	17.6%	13.9%	15.3%	SAME	3.7%	1.27
	People (Age 45-64)	% of deaths by age	26.0%	23.7%	20.3%	22.4%	16.6%	18.9%	HIGHER	5.8%	1.35
	People (Age 65+)	% of deaths by age	34.6%	29.4%	29.1%	30.2%	27.8%	28.8%	HIGHER	2.4%	1.09
	B. % Births, Mother's Education <12 Yrs.										
	Mothers (Age 18-24)	% of births by age	21.7%	23.8%	25.0%	24.1%	23.9%	24.0%	SAME	0.2%	1.01
	Mothers (Age 25+)	% of births by age	4.3%	4.1%	5.3%	4.8%	3.8%	4.1%	HIGHER	1.0%	1.26
PCAD 1993-1997 Infant Health (Age <1)	Health Status, Behaviors, and Barriers										
	Infant Mortality per 1,000 live births	Rate per 1,000 live births	-	6.4	5.4	5.6	5.1	5.3	SAME	0.5	1.10
	Low Birthweight Births	% of births	4.6%	5.5%	5.4%	5.3%	5.2%	5.3%	SAME	0.1%	1.02
	Maternal Smoking	% of births	22.0%	20.9%	20.2%	20.7%	16.1%	17.6%	HIGHER	4.6%	1.29
	Late/No Prenatal Care Initiation	% of births	1.3%	1.9%	2.0%	1.9%	1.5%	1.7%	SAME	0.4%	1.27
	Mother's Education < 12 years	% of births	12.1%	11.9%	13.7%	12.9%	9.9%	10.9%	HIGHER	3.0%	1.30
	Mother's Age < 20	% of births	9.6%	8.6%	9.5%	9.3%	6.3%	7.3%	HIGHER	3.0%	1.48
	Mother Unmarried	% of births	29.8%	24.7%	25.5%	25.9%	20.6%	22.4%	HIGHER	5.3%	1.26
	Medicaid Payment	% of births	34.4%	27.0%	25.2%	27.1%	18.1%	21.2%	HIGHER	9.0%	1.50
PCAD 1993-1997 Children (Age 1-14)	A. Mortality Rate per 100,000	Rate per 100,000 by age									
	All Causes	Rate per 100,000 by age	-	20.5	15.2	17.5	18.5	18.1	SAME	-1.0	0.95
	Internal Causes	Rate per 100,000 by age	-	-	-	8.9	12.5	11.2	SAME	-3.6	0.71
	Injury Causes	Rate per 100,000 by age	-	-	-	8.0	5.6	6.4	SAME	2.4	1.43
	Motor Vehicle Accident	Rate per 100,000 by age	-	-	-	-	-	2.3	-	-	-
	B. Hospitalization Rate per 100,000										
	All Admissions	Rate per 100,000 by age	1571.5	1863.1	1835.8	1803.2	1593.4	1,674.1	HIGHER	209.8	1.13
	ACS Admissions	Rate per 100,000 by age	471.6	475.5	443.9	457.9	453.2	455.2	SAME	4.7	1.01
	Marker Condition Admissions	Rate per 100,000 by age	111.5	151.9	143.3	141.0	103.8	117.6	HIGHER	37.2	1.36
	ACS/Marker Condition Admissions	Rate per 100,000 by age	4.2	3.1	3.1	3.2	4.4	3.9	LOWER	-1.2	0.73
	Injury Admissions	Rate per 100,000 by age	266.7	278.7	267.1	270.6	224.4	241.5	HIGHER	46.2	1.21

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PCAD 1993-1997 Adolescents (Age 15-17)	A. Mortality Rate per 100,000										
	All Causes	Rate per 100,000 by age	-	-	47.3	49.4	37.3	42.0	SAME	12.1	1.32
	Internal Causes	Rate per 100,000 by age	-	-	-	-	-	10.2	-	-	-
	Injury Causes	Rate per 100,000 by age	-	-	-	34.0	29.7	31.4	SAME	4.3	1.14
	Total Unintentional	Rate per 100,000 by age	-	-	-	24.1	15.2	18.6	SAME	8.9	1.59
	Motor Vehicle Accident	Rate per 100,000 by age	-	-	-	21.9	-	16.5	-	-	-
	Total Intentional	Rate per 100,000 by age	-	-	-	-	14.5	12.3	-	-	-
	Suicide	Rate per 100,000 by age	-	-	-	-	-	9.3	-	-	-
	Firearm	Rate per 100,000 by age	-	-	-	-	-	8.9	-	-	-
	B. Hospitalization Rate per 100,000										
	All Admissions	Rate per 100,000 by age	3141.6	3963.1	3964.6	3829.9	2985.1	3,312.2	HIGHER	844.8	1.28
	ACS Admissions	Rate per 100,000 by age	316.2	408.6	286.0	328.1	307.3	315.3	SAME	20.8	1.07
	Marker Condition Admissions	Rate per 100,000 by age	188.4	231.4	251.0	234.8	157.4	187.3	HIGHER	77.4	1.49
	ACS/Marker Condition Admissions	Rate per 100,000 by age	1.7	1.8	1.1	1.4	2.0	1.7	LOWER	-0.6	0.70
	Injury Admissions	Rate per 100,000 by age	598.7	795.5	709.8	717.7	563.5	623.0	HIGHER	154.2	1.27
	Obstetric Admissions	Rate per 100,000 by age	1090.9	1427.0	1638.2	1486.5	1337.2	1,394.9	SAME	149.3	1.11
	C. Birth-related Rates										
	Birth Rate per 1,000 Females	Rate per 1,000 live births	11.9	13.2	17.3	15.2	13.4	14.1	SAME	1.8	1.13
	Low Birthweight Births	% of births	-	-	11.1%	10.6%	7.6%	8.9%	SAME	3.0%	1.39
	Maternal Smoking	% of births	30.6%	40.6%	35.5%	36.2%	34.1%	35.0%	SAME	2.1%	1.06
	Late/No Prenatal Care Initiation	% of births	-	-	5.2%	6.6%	5.7%	6.1%	SAME	0.9%	1.16
	Mother's Education < 12 years	% of births	94.1%	89.9%	91.2%	91.2%	92.6%	92.0%	SAME	-1.4%	0.98
	Mother Unmarried	% of births	91.8%	94.4%	91.1%	92.0%	94.6%	93.6%	SAME	-2.6%	0.97
	Medicaid Payment	% of births	56.3%	59.9%	56.7%	57.5%	51.5%	54.0%	SAME	6.0%	1.12

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PCAD 1993-1997 Young Adult (Age 18-24)	A. Mortality Rate per 100,000										
	All Causes	Rate per 100,000 by age	88.4	56.6	70.5	68.3	50.9	57.4	SAME	17.4	1.34
	Internal Causes	Rate per 100,000 by age	-	-	-	10.3	11.9	11.3	SAME	-1.6	0.87
	Injury Causes	Rate per 100,000 by age	-	46.9	58.7	57.1	38.4	45.4	HIGHER	18.7	1.49
	Total Unintentional	Rate per 100,000 by age	-	-	35.2	34.7	21.5	26.4	HIGHER	13.2	1.61
	Motor Vehicle Accident	Rate per 100,000 by age	-	-	29.4	29.3	18.3	22.4	SAME	11.0	1.60
	Total Intentional	Rate per 100,000 by age	-	-	21.0	20.5	15.4	17.3	SAME	5.1	1.33
	Suicide	Rate per 100,000 by age	-	-	18.5	18.1	13.9	15.5	SAME	4.2	1.30
	Firearm	Rate per 100,000 by age	-	-	-	14.6	9.0	11.1	SAME	5.6	1.62
	B. Hospitalization Rate per 100,000										
	All Admissions	Rate per 100,000 by age	9099.3	7261.3	6210.1	6862.7	5804.5	6,200.4	HIGHER	1058.2	1.18
	ACS Admissions	Rate per 100,000 by age	538.7	450.8	337.2	394.9	312.1	343.0	HIGHER	82.8	1.27
	Marker Condition Admissions	Rate per 100,000 by age	159.9	148.7	140.9	145.5	122.3	131.0	SAME	23.2	1.19
	ACS/Marker Condition Admissions	Rate per 100,000 by age	3.4	3.0	2.4	2.7	2.6	2.6	SAME	0.1	1.04
	Injury Admissions	Rate per 100,000 by age	757.6	672.2	516.7	591.6	483.0	523.7	HIGHER	108.6	1.22
	Obstetric Admissions	Rate per 100,000 by age	9494.1	6926.6	6430.7	6924.9	6148.7	6,434.4	HIGHER	776.2	1.13
	C. Birth-related Rates										
	Birth Rate per 1,000 Females	Rate per 1,000 live births	100.5	69.0	67.1	71.4	62.0	65.5	HIGHER	9.4	1.15
	Low Birthweight Births	% of births	5.7%	6.3%	5.9%	6.0%	5.7%	5.8%	SAME	0.3%	1.05
	Maternal Smoking	% of births	32.7%	31.8%	31.2%	31.6%	28.9%	30.0%	HIGHER	2.7%	1.09
	Late/No Prenatal Care Initiation	% of births	-	3.2%	3.2%	2.9%	3.1%	3.0%	SAME	-0.2%	0.94
	Mother's Education < 12 years	% of births	21.7%	23.8%	25.0%	24.1%	23.9%	24.0%	SAME	0.2%	1.01
	Mother Unmarried	% of births	54.0%	49.1%	50.5%	50.7%	51.9%	51.4%	SAME	-1.2%	0.98
	Medicaid Payment	% of births	59.3%	52.4%	49.5%	51.9%	44.2%	47.3%	HIGHER	7.7%	1.17

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PCAD 1993-1997 Adults (Age 25-44)	A. Mortality Rate per 100,000										
	All Causes	Rate per 100,000 by age	129.6	119.9	118.2	120.5	100.8	107.6	HIGHER	19.7	1.20
	Internal Causes	Rate per 100,000 by age	77.8	65.1	73.5	71.6	61.8	65.2	SAME	9.8	1.16
	Heart Disease	Rate per 100,000 by age	-	13.8	14.1	14.4	12.5	13.1	SAME	1.9	1.15
	Cancer	Rate per 100,000 by age	32.6	23.2	25.5	25.9	21.8	23.3	SAME	4.1	1.19
	Breast (Female)	Rate per 100,000 by age	-	-	-	8.0	7.2	7.4	SAME	0.8	1.11
	Cervix	Rate per 100,000 by age	-	-	-	-	-	2.0	-	-	-
	Colon	Rate per 100,000 by age	-	-	-	-	-	1.0	-	-	-
	Lung	Rate per 100,000 by age	-	-	-	4.6	2.5	3.2	SAME	2.1	1.84
	Prostate	Rate per 100,000 by age	-	-	-	-	-	0.1	-	-	-
	Diabetes-related Mortality	Rate per 100,000 by age	-	-	7.2	5.8	4.2	4.8	SAME	1.6	1.38
	Injury Causes	Rate per 100,000 by age	49.0	50.8	40.8	45.1	36.4	39.4	HIGHER	8.7	1.24
	Total Unintentional	Rate per 100,000 by age	30.7	27.1	18.6	23.1	17.2	19.3	SAME	5.9	1.34
	Motor Vehicle Accident	Rate per 100,000 by age	-	15.3	9.2	12.1	9.5	10.4	SAME	2.6	1.27
	Total Intentional	Rate per 100,000 by age	-	21.7	18.6	19.0	15.6	16.8	SAME	3.4	1.22
	Suicide	Rate per 100,000 by age	-	18.3	15.8	15.9	13.7	14.4	SAME	2.2	1.16
	Firearm	Rate per 100,000 by age	-	10.9	10.5	11.1	7.9	9.0	SAME	3.2	1.41
	B. Cancer Incidence Rate per 100,000										
	Breast (Female)	Rate per 100,000 by age	51.3	57.2	52.0	53.5	52.7	53.6	SAME	0.8	1.02
	Cervix	Rate per 100,000 by age	-	-	13.1	12.7	11.1	11.7	SAME	1.6	1.14
	Colon	Rate per 100,000 by age	-	-	5.5	4.2	2.9	3.4	SAME	1.3	1.45
	Lung	Rate per 100,000 by age	-	-	6.4	5.8	4.5	5.0	SAME	1.3	1.29
	Prostate	Rate per 100,000 by age	-	-	-	-	-	0.7	-	-	-
	C. Hospitalization Rate per 100,000										
	All Admissions	Rate per 100,000 by age	7015.8	8109.5	7551.8	7637.5	7227.8	7,372.1	HIGHER	409.7	1.06
	ACS Admissions	Rate per 100,000 by age	499.3	492.5	442.7	466.6	385.5	413.7	HIGHER	81.1	1.21
	Marker Condition Admissions	Rate per 100,000 by age	126.7	171.2	144.8	150.0	130.1	137.0	HIGHER	19.9	1.15
	ACS/Marker Condition Admissions	Rate per 100,000 by age	3.9	2.9	3.1	3.1	3.0	3.0	SAME	0.1	1.03
	Injury Admissions	Rate per 100,000 by age	683.6	705.7	565.0	626.2	513.1	552.4	HIGHER	113.1	1.22
	Obstetric Admissions	Rate per 100,000 by age	4001.1	4852.6	4754.8	4667.5	5833.6	5,425.6	LOWER	-1166.1	0.80
	D. Birth-related Rates										
	Birth Rate per 1,000 Females	Rate per 1,000 live births	44.2	49.0	50.9	49.2	59.6	56.0	LOWER	-10.4	0.83
	Low Birthweight Births	% of births	3.9%	5.0%	5.0%	4.8%	5.0%	5.0%	SAME	-0.2%	0.96
	Maternal Smoking	% of births	16.4%	15.6%	14.9%	15.3%	11.9%	13.0%	HIGHER	3.4%	1.29
	Late/No Prenatal Care Initiation	% of births	1.0%	1.1%	1.4%	1.2%	1.0%	1.1%	SAME	0.2%	1.20
	Mother's Education < 12 years	% of births	4.3%	4.1%	5.3%	4.8%	3.8%	4.1%	HIGHER	1.0%	1.26
	Mother Unmarried	% of births	15.5%	11.9%	11.8%	12.4%	9.7%	10.5%	HIGHER	2.7%	1.28
	Medicaid Payment	% of births	21.3%	15.2%	13.3%	15.0%	9.4%	11.2%	HIGHER	5.6%	1.60

Appendix B: Tables of Statistical Findings

Data Source	Statistic	Units	Rural Low Density	Rural Medium Density	Rural High Density	All Rural	Non- Rural	State	95% conf. Rural is Statistically:	All Rural : Non-Rural Difference	All Rural : Non-Rural Ratio
PCAD 1993-1997 Middle Age (Age 45-64)	A. Mortality Rate per 100,000										
	All Causes	Rate per 100,000 by age	630.4	566.9	582.0	585.5	565.1	573.1	SAME	20.4	1.04
	Internal Causes	Rate per 100,000 by age	563.3	519.9	531.1	533.0	522.7	526.8	SAME	10.3	1.02
	Heart Disease	Rate per 100,000 by age	142.6	142.4	149.8	146.2	140.4	142.7	SAME	5.8	1.04
	Cancer	Rate per 100,000 by age	267.3	228.7	239.1	240.6	234.4	236.9	SAME	6.2	1.03
	Breast (Female)	Rate per 100,000 by age	47.8	42.2	48.0	46.1	46.3	46.2	SAME	-0.2	1.00
	Cervix	Rate per 100,000 by age	-	-	-	-	5.3	5.6	-	-	-
	Colon	Rate per 100,000 by age	25.2	18.7	14.1	17.5	15.0	16.0	SAME	2.5	1.17
	Lung	Rate per 100,000 by age	97.1	65.7	78.4	77.5	73.5	75.1	SAME	4.0	1.05
	Prostate	Rate per 100,000 by age	-	-	-	-	7.3	7.2	-	-	-
	Chronic Obstructive Pulmonary Disease	Rate per 100,000 by age	24.0	20.0	25.0	23.2	21.0	21.9	SAME	2.2	1.10
	Diabetes-related Mortality	Rate per 100,000 by age	44.3	51.5	50.9	50.0	48.6	49.2	SAME	1.4	1.03
	Injury Causes	Rate per 100,000 by age	55.1	38.7	42.4	43.4	34.0	37.7	SAME	9.4	1.28
	Total Unintentional	Rate per 100,000 by age	26.4	18.0	22.2	21.6	17.5	19.1	SAME	4.1	1.23
	Motor Vehicle Accident	Rate per 100,000 by age	-	-	8.5	8.8	7.8	8.2	SAME	1.0	1.13
	Total Intentional	Rate per 100,000 by age	26.4	20.0	19.0	20.6	15.3	17.4	SAME	5.3	1.35
	Suicide	Rate per 100,000 by age	-	18.0	17.8	18.1	13.9	15.6	SAME	4.2	1.30
	Firearm	Rate per 100,000 by age	-	-	13.3	14.4	8.0	10.5	HIGHER	6.4	1.80
	B. Cancer Incidence Rate per 100,000										
	Breast (Female)	Rate per 100,000 by age	222.5	217.3	264.1	242.1	253.6	251.3	SAME	-11.5	0.95
	Cervix	Rate per 100,000 by age	-	-	-	15.1	16.5	15.9	SAME	-1.4	0.92
	Colon	Rate per 100,000 by age	39.6	39.9	33.1	36.4	40.2	38.9	SAME	-3.8	0.91
	Lung	Rate per 100,000 by age	94.7	86.3	87.2	88.2	101.1	96.5	SAME	-12.9	0.87
	Prostate	Rate per 100,000 by age	79.3	185.7	123.9	135.9	175.6	160.6	LOWER	-39.7	0.77
	C. Hospitalization Rate per 100,000										
	All Admissions	Rate per 100,000 by age	10030.6	9824.8	9571.5	9731.1	9261.3	9,452.5	HIGHER	469.8	1.05
	ACS Admissions	Rate per 100,000 by age	1609.6	1389.6	1276.3	1369.6	1145.6	1,234.8	HIGHER	224.0	1.20
	Marker Condition Admissions	Rate per 100,000 by age	456.6	452.2	469.3	461.7	456.2	458.3	SAME	5.5	1.01
	ACS/Marker Condition Admissions	Rate per 100,000 by age	3.5	3.1	2.7	3.0	2.5	2.7	HIGHER	0.5	1.20
	Injury Admissions	Rate per 100,000 by age	824.6	816.9	743.1	780.6	716.2	741.9	HIGHER	64.4	1.09

Appendix B: Tables of Statistical Findings

Data Source	Statistic	Units	Rural Low Density	Rural Medium Density	Rural High Density	All Rural	Non- Rural	State	95% conf. Rural is Statistically:	All Rural : Non-Rural Difference	All Rural : Non-Rural Ratio
PCAD 1993-1997 Senior (Age 65-74)	A. Mortality Rate per 100,000										
	All Causes	Rate per 100,000 by age	2461.9	2323.6	2489.6	2427.3	2552.3	2,497.0	SAME	-125.0	0.95
	Internal Causes	Rate per 100,000 by age	2386.4	2240.0	2389.1	2337.1	2479.2	2,416.3	LOWER	-142.1	0.94
	Heart Disease	Rate per 100,000 by age	771.5	631.8	720.1	698.6	731.3	716.8	SAME	-32.7	0.96
	Cancer	Rate per 100,000 by age	905.2	922.5	916.2	916.4	919.6	918.2	SAME	-3.2	1.00
	Breast (Female)	Rate per 100,000 by age	-	135.3	90.1	101.7	139.7	123.2	SAME	-38.0	0.73
	Cervix	Rate per 100,000 by age	-	-	-	-	-	7.9	-	-	-
	Colon	Rate per 100,000 by age	78.9	85.3	62.8	73.4	74.6	74.1	SAME	-1.2	0.98
	Lung	Rate per 100,000 by age	339.4	288.9	277.7	292.4	303.5	298.6	SAME	-11.1	0.96
	Prostate	Rate per 100,000 by age	-	95.7	104.7	99.1	95.8	97.3	SAME	3.3	1.03
	Cerebrovascular Disease	Rate per 100,000 by age	78.9	87.0	125.7	104.1	131.0	119.1	SAME	-26.9	0.79
	Chronic Obstructive Pulmonary Disease	Rate per 100,000 by age	164.6	163.6	153.3	158.9	168.2	164.1	SAME	-9.3	0.94
	Diabetes-related Mortality	Rate per 100,000 by age	257.2	212.3	280.3	252.7	282.5	269.3	SAME	-29.8	0.89
	Injury Causes	Rate per 100,000 by age	-	60.9	64.1	57.8	45.9	51.1	SAME	11.9	1.26
	Total Unintentional	Rate per 100,000 by age	-	41.8	46.5	41.5	35.4	38.1	SAME	6.1	1.17
	Falls	Rate per 100,000 by age	-	-	-	13.8	9.6	11.5	SAME	4.2	1.44
	Motor Vehicle Accident	Rate per 100,000 by age	-	-	-	14.4	14.3	14.4	SAME	0.1	1.01
	Total Intentional	Rate per 100,000 by age	-	-	-	16.2	10.0	12.8	SAME	6.2	1.62
	Suicide	Rate per 100,000 by age	-	-	-	16.2	-	12.0	-	-	-
	Firearm	Rate per 100,000 by age	-	-	-	12.0	-	9.3	-	-	-
	B. Cancer Incidence Rate per 100,000										
	Breast (Female)	Rate per 100,000 by age	436.8	415.8	422.9	422.8	438.1	433.4	SAME	-15.3	0.97
	Cervix	Rate per 100,000 by age	-	-	-	-	-	11.3	-	-	-
	Colon	Rate per 100,000 by age	171.4	144.5	170.9	161.9	193.6	180.1	SAME	-31.7	0.84
	Lung	Rate per 100,000 by age	291.4	304.6	309.2	304.5	375.7	345.5	LOWER	-71.2	0.81
	Prostate	Rate per 100,000 by age	790.8	835.9	903.8	859.3	885.6	880.7	SAME	-26.3	0.97
	C. Hospitalization Rate per 100,000										
	All Admissions	Rate per 100,000 by age	23778.5	23775.1	24051.8	23908.2	22886.0	23,348.3	HIGHER	1022.2	1.04
	ACS Admissions	Rate per 100,000 by age	4920.3	4318.2	4540.7	4530.4	4035.5	4,255.3	HIGHER	494.9	1.12
	Marker Condition Admissions	Rate per 100,000 by age	1282.4	1214.9	1325.9	1279.9	1294.3	1,287.9	SAME	-14.4	0.99
	ACS/Marker Condition Admissions	Rate per 100,000 by age	3.8	3.6	3.4	3.5	3.1	3.3	HIGHER	0.4	1.13
	Injury Admissions	Rate per 100,000 by age	1690.4	1761.4	1671.5	1705.9	1586.4	1,639.5	HIGHER	119.5	1.08

Appendix B: Tables of Statistical Findings

Data Source	Statistic	Units	Rural Low Density	Rural Medium Density	Rural High Density	All Rural	Non- Rural	State	95% conf. Rural is Statistically:	All Rural : Non-Rural Difference	All Rural : Non-Rural Ratio
PCAD 1993-1997 Elderly (Age 75 +)	A. Mortality Rate per 100,000										
	All Causes	Rate per 100,000 by age	8461.4	8223.3	9038.3	8671.0	8427.7	8,534.9	SAME	243.3	1.03
	Internal Causes	Rate per 100,000 by age	8127.4	7963.6	8746.0	8382.7	8198.8	8,279.8	SAME	183.9	1.02
	Heart Disease	Rate per 100,000 by age	2934.8	2876.5	3153.0	3024.7	3080.6	3,055.9	SAME	-55.9	0.98
	Cancer	Rate per 100,000 by age	1465.2	1456.0	1570.6	1514.9	1556.0	1,537.9	SAME	-41.1	0.97
	Breast (Female)	Rate per 100,000 by age	175.8	171.7	193.1	183.3	174.6	178.3	SAME	8.7	1.05
	Cervix	Rate per 100,000 by age	-	-	-	-	-	7.6			
	Colon	Rate per 100,000 by age	155.9	135.4	178.6	160.4	171.8	166.8	SAME	-11.4	0.93
	Lung	Rate per 100,000 by age	351.8	275.2	394.1	347.5	351.2	349.5	SAME	-3.7	0.99
	Prostate	Rate per 100,000 by age	375.0	391.6	375.6	380.9	423.5	403.8	SAME	-42.6	0.90
	Cerebrovascular Disease	Rate per 100,000 by age	654.6	728.0	906.3	805.1	807.1	806.3	SAME	-2.0	1.00
	Chronic Obstructive Pulmonary Dis	Rate per 100,000 by age	498.8	441.7	544.7	502.8	468.2	483.4	SAME	34.6	1.07
	Diabetes-related Mortality	Rate per 100,000 by age	792.7	663.6	760.2	733.4	740.7	737.5	SAME	-7.3	0.99
	Injury Causes	Rate per 100,000 by age	213.8	177.6	180.1	184.8	128.1	153.1	HIGHER	56.7	1.44
	Total Unintentional	Rate per 100,000 by age	204.9	153.1	152.0	161.2	113.0	134.2	HIGHER	48.2	1.43
	Falls	Rate per 100,000 by age	-	48.8	69.4	65.1	53.6	58.6	SAME	11.5	1.21
	Motor Vehicle Accident	Rate per 100,000 by age	-	-	-	31.8	22.1	26.4	SAME	9.7	1.44
	Total Intentional	Rate per 100,000 by age	-	-	-	23.7	14.6	18.6	SAME	9.1	1.62
	Suicide	Rate per 100,000 by age	-	-	-	22.9	-	16.3	-	-	-
	Firearm	Rate per 100,000 by age	-	-	-	15.5	-	11.4	-	-	-
	B. Cancer Incidence Rate per 100,000										
	Breast (Female)	Rate per 100,000 by age	373.5	404.3	402.2	398.3	444.4	425.6	SAME	-46.1	0.90
	Cervix	Rate per 100,000 by age	-	-	-	-	-	13.6	-	-	-
	Colon	Rate per 100,000 by age	418.6	293.0	320.3	327.5	330.2	330.3	SAME	-2.7	0.99
	Lung	Rate per 100,000 by age	267.2	224.2	321.8	280.2	334.8	312.4	SAME	-54.6	0.84
	Prostate	Rate per 100,000 by age	863.6	911.7	825.4	861.6	1034.0	959.8	LOWER	-172.4	0.83
	C. Hospitalization Rate per 100,000										
	All Admissions	Rate per 100,000 by age	37764.4	39735.9	38306.9	38692.8	35551.5	36,938.8	HIGHER	3141.3	1.09
	ACS Admissions	Rate per 100,000 by age	9953.2	9104.4	9352.7	9369.7	8093.4	8,655.8	HIGHER	1276.3	1.16
	Marker Condition Admissions	Rate per 100,000 by age	2899.1	3378.1	3324.2	3271.6	3179.0	3,219.8	SAME	92.6	1.03
	ACS/Marker Condition Admissions	Rate per 100,000 by age	3.4	2.7	2.8	2.9	2.5	2.7	HIGHER	0.4	1.16
	Injury Admissions	Rate per 100,000 by age	3687.4	4121.6	3770.0	3873.4	3595.4	3,717.9	HIGHER	278.0	1.08

Appendix B: Tables of Statistical Findings

Data Source	Statistic	Units	Rural Low Density	Rural Medium Density	Rural High Density	All Rural	Non- Rural	State	95% conf. Rural is Statistically:	All Rural : Non-Rural Difference	All Rural : Non-Rural Ratio
PCAD 1993-1997 Age Adjusted Rates	A. Mortality Rate per 100,000										
	All Causes	Age Adj.Rate per 100,000				793.9	776.3	782.9	SAME	17.6	1.02
	Injury Causes	Age Adj.Rate per 100,000				46.2	35.1	39.3	HIGHER	11.1	1.32
	B. Hospitalization Rate per 100,000										
	All Admissions	Age Adj.Rate per 100,000				9384.4	8738.3	8981.4	HIGHER	646.1	1.07
	ACS Admissions	Age Adj.Rate per 100,000				1380.2	1196.1	1265.4	HIGHER	184.1	1.15
	Marker Condition Admissions	Age Adj.Rate per 100,000				456.4	431.8	441.0	HIGHER	24.6	1.06
	Injury Admissions	Age Adj.Rate per 100,000				830.3	730.6	768.1	HIGHER	99.7	1.14

Appendix B: Tables of Statistical Findings

Data Source	Question / Measure	Response of Interest	All Rural	Non-Rural	95% Conf. Rural Is statistically:	Rural: NonRural Difference	Rural: NonRural Ratio	NOTE
BRFSS - Health Status and Access	Would you say that in general your health is:	Fair or Poor	11.1%	8.2%	HIGHER	2.9%	1.35	
	Now thinking about your physical health, which includes physical illness and injury, for how many days during the past 30 days was your physical health not good?	Mean number of days	3.3	2.7	SAME	0.6	1.22	
	Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?	Mean number of days	2.8	3.0	SAME	(0.2)	0.93	
	During the past 30 days, for about how many days did poor physical or mental health keep you from doing your usual activities, such as self-care, work, or recreation?	Mean number of days	1.7	1.4	SAME	0.3	1.21	
	Do you have any kind of health care coverage, including health insurance, prepaid plans such as HMOs, or government plans such as Medicare?	No	13.8%	9.5%	HIGHER	4.3%	1.45	
	Do you have one person you think of as your personal doctor or health care provider?	No	15.2%	13.0%	SAME	2.2%	1.17	
	Where is your usual source of services for female health concerns, such as family planning, annual exams, breast exams, tests for sexually transmitted diseases, and other female health concerns?	Provider other than Gynecologist	63.9%	51.4%	HIGHER	12.5%	1.24	Asked only to non-pregnant women aged 44 and younger

Appendix B: Tables of Statistical Findings

Data Source	Question / Measure	Response of Interest	All Rural	Non-Rural	95% Conf. Rural Is statistically:	Rural: NonRural Difference	Rural: NonRural Ratio	NOTE
BRFSS - Oral Health	How long has it been since you last visited a dentist or a dental clinic for any reason?	Other Than 'Within the past year.'	25.4%	22.1%	SAME	3.3%	1.15	
	How long has it been since you had your teeth cleaned by a dentist or dental hygienist?	Other Than 'Within the past year.'	24.6%	20.5%	SAME	4.1%	1.20	
	Do you have any kind of insurance coverage that pays for some or all of your routine dental care, including dental insurance, prepaid plans such as HMOs, or government plans such as Medicaid?	No	46.2%	35.1%	HIGHER	11.1%	1.32	
BRFSS - Prevention	During the past 12 months, have you had a flu shot?	No	68.7%	71.2%	SAME	-2.5%	0.96	
	Have you ever had a pneumonia shot?	No	78.5%	80.8%	SAME	-2.3%	0.97	
	Have you ever had a PSA test?	No	42.9%	42.4%	SAME	0.5%	1.01	
	Have you ever had a digital rectal exam?	No	13.3%	16.3%	SAME	-3.0%	0.82	
	A blood stool test is a test that may use a special kit at home to determine whether the stool contains blood. Have you ever had this test using a home kit?	No	47.2%	48.7%	SAME	-1.5%	0.97	Asked only to people aged 50 and older
	As far as you know, have you ever been tested for HIV?	No	56.1%	55.0%	SAME	1.1%	1.02	Asked only to people aged 64 and younger
	In the past 12 months has a doctor, nurse, or other health professional talked to you about preventing sexually transmitted diseases through condom use?	No	86.8%	84.8%	SAME	2.0%	1.02	Asked only to people aged 64 and younger

Appendix B: Tables of Statistical Findings

Data Source	Question / Measure	Response of Interest	All Rural	Non-Rural	95% Conf. Rural Is statistically:	Rural: NonRural Difference	Rural: NonRural Ratio	NOTE
BRFSS - Physical Activity	During the past 30 days, other than your regular job, did you participate in any physical activities or exercise such as running, calisthenics, golf, gardening, or walking for exercise?	No	18.4%	20.3%	SAME	-1.9%	0.91	
	Moderate Physical Activity Measurement: Doing moderate physical activity for 30 or more minutes per day, five or more days per week or respondents who report doing vigorous physical activity for 20 or more minutes per day, three or more days per week	No	48.5%	50.1%	SAME	-1.6%	0.97	
	Vigorous Physical Activity Measurement: Doing vigorous physical activity for 20 or more minutes per day, three or more days per week	No	72.6%	71.9%	SAME	0.7%	1.01	
BRFSS - Cardiovascular	Have you ever been told by a doctor, nurse, or other health professional that you have high blood pressure?	Yes	24.3%	22.2%	SAME	2.1%	1.09	
	About how long has it been since you last had your blood cholesterol checked?	More than 12 months ago	32.1%	29.7%	SAME	2.4%	1.08	
	Have you ever been told by a doctor, nurse, or other health professional that your blood cholesterol is high?	Yes	30.2%	31.6%	SAME	-1.4%	0.96	
	Overweight and Obesity (Based on BMI from height & weight responses)	Respondent is Overweight or Obese	56.6%	56.2%	SAME	0.4%	1.01	

Appendix B: Tables of Statistical Findings

Data Source	Question / Measure	Response of Interest	All Rural	Non-Rural	95% Conf. Rural Is statistically:	Rural: NonRural Difference	Rural: NonRural Ratio	NOTE
BRFSS - Chronic Disease	Have you ever been told by a doctor, nurse, or other health professional that you had asthma?	Yes	12.2%	12.5%	SAME	-0.3%	0.98	
	Do you still have asthma?	Yes	74.8%	66.0%	SAME	8.8%	1.13	
	Have you ever been told by a doctor that you have diabetes?	Yes	6.8%	4.6%	SAME	2.2%	1.48	Diabetes only during pregnancy included in "No"
	Chronic joint symptoms (CJS) present on most days for at least one month during the last year	Yes	23.8%	19.9%	SAME	3.9%	1.20	
	Limited activities due to chronic joint symptoms during the last year	Yes	10.6%	7.1%	HIGHER	3.5%	1.49	
BRFSS - Behavior	Current Smoking Status	Respondent is Current smoker	25.5%	22.9%	SAME	2.6%	1.11	
	How old were you the first time you smoked a cigarette, even one or two puffs?	Mean age	14.7	14.8	SAME	(0.1)	0.99	
	How old were you when you first started smoking cigarettes regularly?	Mean age	17.4	17.4	SAME	-	1.00	
	Binge Drinking : Drank alcohol in the past 30 days and had five or more drinks on one or more occasions in the past month	Yes	14.3%	16.2%	SAME	-1.9%	0.88	
	Heavy Alcohol Consumption: Male respondents who report they had more than 2 drinks per day, or female respondents who report they had more than 1 drink per day	Yes	7.2%	5.4%	SAME	1.8%	1.33	

Appendix B: Tables of Statistical Findings

Data Source	Question / Measure	Response of Interest	All Rural	Non-Rural	95% Conf. Rural Is statistically:	Rural: NonRural Difference	Rural: NonRural Ratio	NOTE
BRFSS - Injury	Are any firearms now kept in or around your home? Include those kept in a garage, outdoor storage area, car, truck, or other motor vehicle	Yes	39.2%	24.1%	HIGHER	15.1%	1.63	
	During the past 12 months, have you been subject to any physical violence?	Yes	2.7%	2.6%	SAME	0.1%	1.04	
	Do you think it's OK for a man to hit his wife, partner, or girlfriend, to discipline or keep her in line?	Yes	0.4%	0.6%	SAME	-0.2%	0.67	
	During the past 12 months, have you ever seriously considered attempting suicide?	Yes	2.3%	1.7%	SAME	0.6%	1.35	

Appendix C: NH RURAL HEALTH REPORT

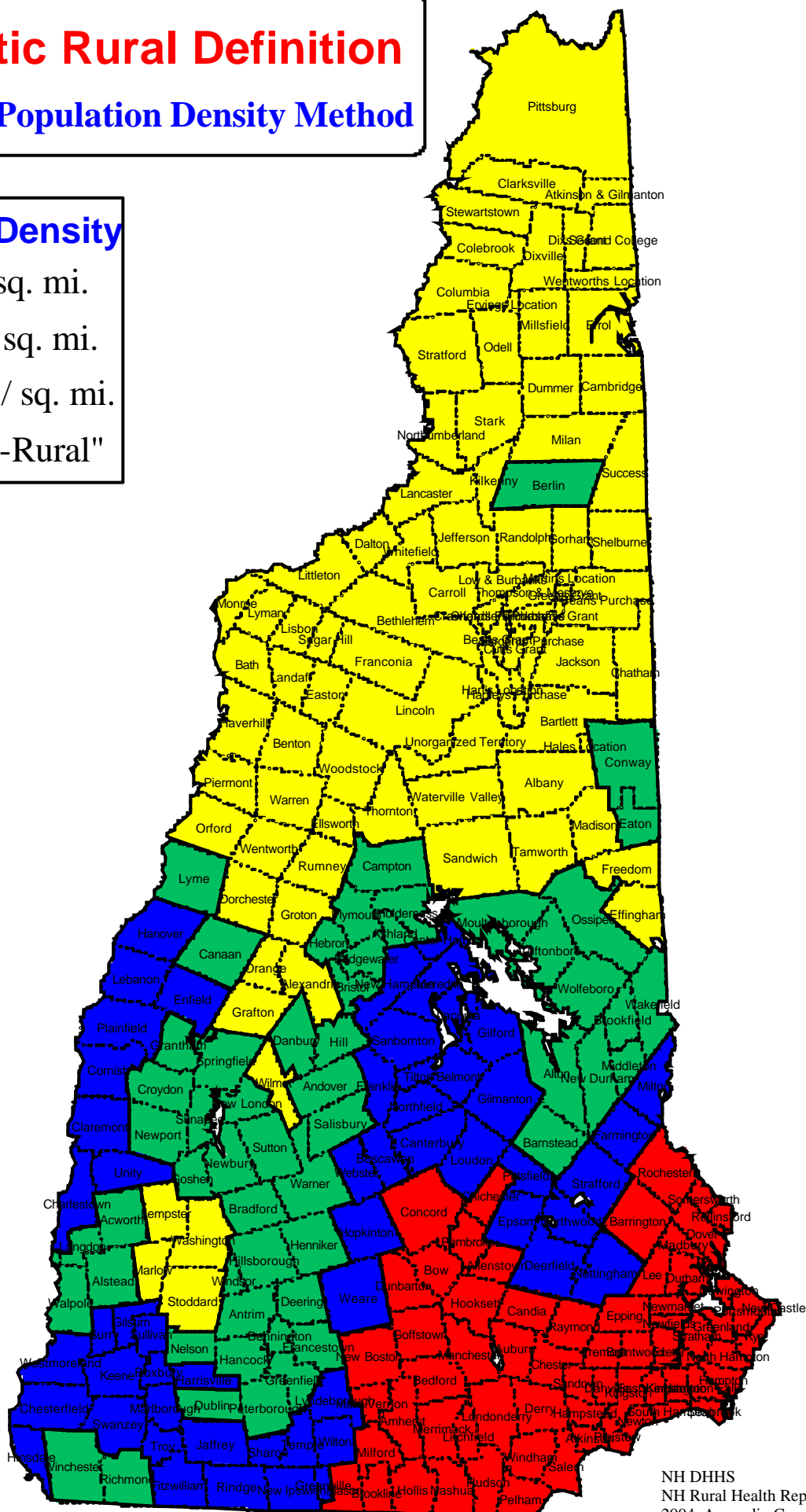
RURAL DEFINITION BY CITY/TOWN

N.H. Analytic Rural Definition

Using 10 Mile Population Density Method

10 Mile Pop. Density

- Up to 50 / sq. mi.
- 50 to 100 / sq. mi.
- 100 to 200 / sq. mi.
- 200+ "Non-Rural"



Miles

0 10 20

Appendix C: Rural Definition by City/Town

Rural – Low Density

Albany	Freedom	Orford
Alexandria	Gorham	Piermont
Atkinson & Gilmanton	Grafton	Pinkham's Grant
Bartlett	Greens Grant	Pittsburg
Bath	Groton	Randolph
Beans Grant	Hadleys Purchase	Rumney
Beans Purchase	Hales Location	Sandwich
Benton	Hart's Location	Sargents Purchase
Bethlehem	Haverhill	Second College
Cambridge	Jackson	Shelburne
Carroll	Jefferson	Stark
Chandlers Purchase	Kilkenny	Stewartstown
Chatham	Lancaster	Stoddard
Clarksville	Landaff	Stratford
Colebrook	Lempster	Success
Columbia	Lincoln	Sugar Hill
Crawfords Purchase	Lisbon	Tamworth
Cutts Grant	Littleton	Thompson & Meserve
Dalton	Low & Burbanks	Thornton
Dixs Grant	Lyman	Unorganized Territory
Dixville	Madison	Warren
Dorchester	Marlow	Washington
Dummer	Martins Location	Waterville Valley
Easton	Milan	Wentworth
Effingham	Millsfield	Wentworths Location
Ellsworth	Monroe	Whitefield
Errol	Northumberland	Wilmot
Erving's Location	Odell	Woodstock
Franconia	Orange	

Rural – Medium Density

Acworth	Dublin	Newbury
Alstead	Eaton	Newport
Alton	Fracestown	Ossipee
Andover	Goshen	Peterborough
Antrim	Grantham	Plymouth
Ashland	Greenfield	Richmond
Barnstead	Hancock	Salisbury
Bennington	Hebron	Springfield
Berlin	Henniker	Sunapee
Bradford	Hill	Sutton
Bridgewater	Hillsborough	Tuftonboro
Bristol	Holderness	Wakefield
Brookfield	Langdon	Walpole
Campton	Lyme	Warner
Canaan	Middleton	Winchester
Conway	Moultonborough	Windsor
Croydon	Nelson	Wolfeboro
Danbury	New Durham	
Deering	New London	

Rural – High Density

Belmont	Hanover	Pittsfield
Boscawen	Harrisville	Plainfield
Canterbury	Hinsdale	Rindge
Center Harbor	Hopkinton	Roxbury
Charlestown	Jaffrey	Sanbornton
Chesterfield	Keene	Sharon
Claremont	Laconia	Strafford
Cornish	Lebanon	Sullivan
Deerfield	Loudon	Surry
Enfield	Lyndeborough	Swanzey
Epsom	Marlborough	Temple
Farmington	Meredith	Tilton
Fitzwilliam	Milton	Troy
Franklin	New Hampton	Unity
Gilford	New Ipswich	Weare
Gilmanton	Northfield	Webster
Gilsum	Northwood	Westmoreland
Greenville	Nottingham	Wilton

Non-Rural

Allenstown
Amherst
Atkinson
Auburn
Barrington
Bedford
Bow
Brentwood
Brookline
Candia
Chester
Chichester
Concord
Danville
Derry
Dover
Dunbarton
Durham
East Kingston
Epping
Exeter
Fremont

Goffstown
Greenland
Hampstead
Hampton
Hampton Falls
Hollis
Hooksett
Hudson
Kensington
Kingston
Lee
Litchfield
Londonderry
Madbury
Manchester
Mason
Merrimack
Milford
Mont Vernon
Nashua
New Boston
New Castle

Newfields
Newington
Newmarket
Newton
North Hampton
Pelham
Pembroke
Plaistow
Portsmouth
Raymond
Rochester
Rollinsford
Rye
Salem
Sandown
Seabrook
Somersworth
South Hampton
Stratham
Windham

Appendix D: NH RURAL HEALTH REPORT: Analytical Support

Analytic Support Provided by:

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Bureau of Health Statistics and Data Management
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